



PI Kuen B, Lubitz W, Sleytr U;  
XX WPI: 1997-394558/37.  
XX  
PI Preparation of S-layer proteins by expressing sbs-A gene in Gram  
PI negative bacterium - or new sbs-B gene in any host, also new  
PI recombinant proteins containing heterologous inserts, e.g.  
PI epitope(s), useful as vaccines and adjuvants  
XX  
PS Claim 1; Pages 9-14; 31pp; German.  
XX  
CC The present sequence encodes the Bacillus stearothermophilus PV72  
CC S-layer protein, sbs-A. S-layer structures can be used as vaccines  
CC or adjuvants, particularly when they include a bacterial ghost that  
CC may contain additional epitopes in its membrane. Other uses of  
CC recombinant sbs-A, depending on the nature of the inserted peptide,  
CC are as an universal carrier for biotinylated reactants for use in  
CC immunological or hybridisation assays (the insert is streptavidin),  
CC to induce immune responses (epitopes), as a reagent for removing  
CC cytokine or toxin from serum (antigenic epitopes), as a molecular  
CC spinning nozzle (polyhydroxybutyrate synthase) and as a molecular  
CC laser (luciferase).  
XX  
SQ Sequence 3687 BP; 1316 A; 660 C; 715 G; 996 T; 0 other:  
  
Query Match 100.0%; Score 3687; DB 18; Length 3687;  
Best Local Similarity 100.0%; Pred. No. 0;  
Matches 3687; Conservative 0; Mismatches 0; Indels 0; Gaps 0;  
  
QY 1 atgtagtagaanaagctgtgaaacttagcaacagcaagtgctattgagcaagtcattt 60  
DB 1 atgtagtagaanaagctgtgaaacttagcaacagcaagtgctattgagcaagtcattt 60  
QY 61 gtcgctgcaaatccaaacgcttcgaagcggtacagatggttagcaacagtagtaagccaa 120  
DB 61 gtcgctgcaaatccaaacgcttcgaagcggtacagatggttagcaacagtagtaagccaa 120  
QY 121 gcaaaagcagcttcaanaaagcatalactactacagccatcacagtaacggaactggt 180  
DB 121 gcaaaagcagcttcaanaaagcatalactactacagccatcacagtaacggaactggt 180  
QY 181 gaatccccaacataacagatgtatatgtctgatacaacaagcgaaanaacgatacgt 240  
DB 181 gaatccccaacataacagatgtatatgtctgatacaacaagcgaaanaacgatacgt 240  
QY 241 gatgcgtagcattagtgataaagcaggtgycgcgaaanaagacgttacttagctgac 300  
DB 241 gatgcgtagcattagtgataaagcaggtgycgcgaaanaagacgttacttagctgac 300  
QY 301 ttacaaaaagaatlgaaacttcgtttccaagcaaaccttaaatctggcgagctcgt 360  
DB 301 ttacaaaaagaatlgaaacttcgtttccaagcaaaccttaaatctggcgagctcgt 360  
QY 361 gtagcaacttaactcgaatgtcttaacactatgcaacaaaattagaagaaatgcccagag 420  
DB 361 gtagcaacttaactcgaatgtcttaacactatgcaacaaaattagaagaaatgcccagag 420  
QY 421 ctgagagctgcttccaagcaaaagatttagaaaagcgaacaatactactatacaaaatt 480  
DB 421 ctgagagctgcttccaagcaaaagatttagaaaagcgaacaatactactatacaaaatt 480  
QY 481 ccttatgaaatlaaactcgcacagtcatttagatcgcgtalatgylaaacaaactcgt 540  
DB 481 ccttatgaaatlaaactcgcacagtcatttagatcgcgtalatgylaaacaaactcgt 540  
QY 541 gatttactcgtctacacatttaagcaaaagcagaactcgcgacagcttaattat 600  
DB 541 gatttactcgtctacacatttaagcaaaagcagaactcgcgacagcttaattat 600  
QY 601 gatattaccgttgcaatgaaagcgcggaagtacagaagcggtgaaagcaagcaattta 660  
DB 601 gatattaccgttgcaatgaaagcgcggaagtacagaagcggtgaaagcaagcaattta 660

QY 661 gacaaagctaaagctgcgttgatccaatcaatcactactccaagaatgaacagatgct 720  
DB 661 gacaaagctaaagctgcgttgatccaatcaatcactactccaagaatgaacagatgct 720  
QY 721 ttcaaaactgaactacagaagaatgaagaaaagaatgagatgagatgcaatgcgtcgt 780  
DB 721 ttcaaaactgaactacagaagaatgaagaaaagaatgagatgagatgcaatgcgtcgt 780  
QY 781 actccaaaagtgaagaatgtagtgcgataacactccaacaaagaagctgtgaaatlaaa 840  
DB 781 actccaaaagtgaagaatgtagtgcgataacactccaacaaagaagctgtgaaatlaaa 840  
QY 841 gcaatcaccggtgaagcaacactaaataatcacacttcgcgcgcgcgaatgaatata 900  
DB 841 gcaatcaccggtgaagcaacactaaataatcacacttcgcgcgcgcgaatgaatata 900  
QY 901 gtaaacgtaaatatcgtatcgtatcataaagtggacggttaacatccattgcccctaat 960  
DB 901 gtaaacgtaaatatcgtatcgtatcataaagtggacggttaacatccattgcccctaat 960  
QY 961 acgycagatgttcttattatcagacggaacaaactacactgtgagcttccaactcca 1020  
DB 961 acgycagatgttcttattatcagacggaacaaactacactgtgagcttccaactcca 1020  
QY 1021 ttccgaataataacagagatataaagtagttaaaggtataaagacacaaaatggcaca 1080  
DB 1021 ttccgaataataacagagatataaagtagttaaaggtataaagacacaaaatggcaca 1080  
QY 1081 gaatttaagaagaatgacatccacttccaagcttccaagatgacgtgttactcaagtg 1140  
DB 1081 gaatttaagaagaatgacatccacttccaagcttccaagatgacgtgttactcaagtg 1140  
QY 1141 ttctggaactaatgtaacaacacacacttcgtaaaacttgcagcgagcttctcgacact 1200  
DB 1141 ttctggaactaatgtaacaacacacacttcgtaaaacttgcagcgagcttctcgacact 1200  
QY 1201 gacgatacttaacagtagtatttgaataagttgttagccactgaaactgtaaacagctcg 1260  
DB 1201 gacgatacttaacagtagtatttgaataagttgttagccactgaaactgtaaacagctcg 1260  
QY 1261 aacgcttactattacagatgttgaaaactgtaaaagcattccagatattgcactactct 1320  
DB 1261 aacgcttactattacagatgttgaaaactgtaaaagcattccagatattgcactactct 1320  
QY 1321 ggttccatacttaccattcgttcaaaagagcgtttagtaactggttaacaatataaact 1380  
DB 1321 ggttccatacttaccattcgttcaaaagagcgtttagtaactggttaacaatataaact 1380  
QY 1381 gctatcaataatgcttaaaacatlaactggttaacatgcaagaagcttaagatgctc 1440  
DB 1381 gctatcaataatgcttaaaacatlaactggttaacatgcaagaagcttaagatgctc 1440  
QY 1441 actgcaaaagcactcgcacacactgttgcctaccgcttccactacttttggttgtaact 1500  
DB 1441 actgcaaaagcactcgcacacactgttgcctaccgcttccactacttttggttgtaact 1500  
QY 1501 ttatctacggttcccttacaacaaatgtttgggtaaatgtgcgcggttggttgatgaa 1560  
DB 1501 ttatctacggttcccttacaacaaatgtttgggtaaatgtgcgcggttggttgatgaa 1560  
QY 1561 gctggaacttattacccgtgcttcaatcacacaacagcttgcactaagttagacgaa 1620  
DB 1561 gctggaacttattacccgtgcttcaatcacacaacagcttgcactaagttagacgaa 1620  
QY 1621 tctacttagcgtgataactgttattagtgtgaaagaagaactcgtgacagttgtctct 1680  
DB 1621 tctacttagcgtgataactgttattagtgtgaaagaagaactcgtgacagttgtctct 1680  
QY 1681 gaactaaaatataatgcagagcctaaatggttaactttagtgcgaagcggaacttaaa 1740  
DB 1681 gaactaaaatataatgcagagcctaaatggttaactttagtgcgaagcggaacttaaa 1740

QY 1741 gaaaatacaatcatcaaaatlaaaaaagcttgaagtcgataaaggtattgaa 1800  
|||||  
DB 1741 gaaaatacaatcatcaaaatlaaaaaagcttgaagtcgataaaggtattgaa 1800  
QY 1801 ttaaggacgctttaaagagaanaacatatgagttcaaaaactcaagacttaactgctctaca 1860  
|||||  
DB 1801 ttaaggacgctttaaagagaanaacatatgagttcaaaaactcaagacttaactgctctaca 1860  
QY 1861 gtattatagcgtataacgtctaaanaatggcgagcgttgatataaagtaactgaagtcagaag 1920  
|||||  
DB 1861 gtattatagcgtataacgtctaaanaatggcgagcgttgatataaagtaactgaagtcagaag 1920  
QY 1921 tttaactgtgaagttctcagaagaatttaatacatttaagttcaacaacgcttttcgggttagc 1980  
|||||  
DB 1921 tttaactgtgaagttctcagaagaatttaatacatttaagttcaacaacgcttttcgggttagc 1980  
QY 1981 acaatcacatacgttcaaaatltgctgtagtaaaaagcggtgcacaactatctgctctaca 2040  
|||||  
DB 1981 acaatcacatacgttcaaaatltgctgtagtaaaaagcggtgcacaactatctgctctaca 2040  
QY 2041 gcaagtgcacatactccagcctagtggttgaagcggttaactgtgtcaagaatggaacatacaa 2100  
|||||  
DB 2041 gcaagtgcacatactccagcctagtggttgaagcggttaactgtgtcaagaatggaacatacaa 2100  
QY 2101 gtgaaagtgtcgtcaacaattagaagcgtlaaccaaggttacaatatagtggttcggt 2160  
|||||  
DB 2101 gtgaaagtgtcgtcaacaattagaagcgtlaaccaaggttacaatatagtggttcggt 2160  
QY 2161 aaaaggtgcacacagctctctgttlaaagaatgctgcanaatgcnaatcattlaagcaactaactat 2220  
|||||  
DB 2161 aaaaggtgcacacagctctctgttlaaagaatgctgcanaatgcnaatcattlaagcaactaactat 2220  
QY 2221 aactataacttacaacatgaaggttcaagcgttaacagcccaacggttacaagaatcatc 2280  
|||||  
DB 2221 aactataacttacaacatgaaggttcaagcgttcaacagcccaacggttacaagaatcatc 2280  
QY 2281 aaaaggtgacttcttaaaaagcgtgaatgcagttactacacttaacgagcgttcaaaaagttatct 2340  
|||||  
DB 2281 aaaaggtgacttcttaaaaagcgtgaatgcagttactacacttaacgagcgttcaaaaagttatct 2340  
QY 2341 caaaaatcactataccaatttagcgagaattaaaaactctagtggtctcttagtgggt 2400  
|||||  
DB 2341 caaaaatcactataccaatttagcgagaattaaaaactctagtggtctcttagtgggt 2400  
QY 2401 ggcagaagtactgtcgagaagaattaaacaacgcgagtggttagtgctgttactgtgaaca 2460  
|||||  
DB 2401 ggcagaagtactgtcgagaagaattaaacaacgcgagtggttagtgctgttactgtgaaca 2460  
QY 2461 actgtatacgttgcctcctaagaacagatgcnaatgtgaaagttaacagctctgtgtgttaca 2520  
|||||  
DB 2461 actgtatacgttgcctcctaagaacagatgcnaatgtgaaagttaacagctctgtgtgttaca 2520  
QY 2521 ttaactgtgtctgcgaataacgacaagaatgcgnaaatgtgcgtctggttagttagtaagtct 2580  
|||||  
DB 2521 ttaactgtgtctgcgaataacgacaagaatgcgnaaatgtgcgtctggttagttagtaagtct 2580  
QY 2581 tctactgtatggaattgctgtgagtgtgtaattgaatgaaggaataatatttaatt 2640  
|||||  
DB 2581 tctactgtatggaattgctgtgagtgtgtaattgaatgaaggaataatatttaatt 2640  
QY 2641 cgttacaagctgtgagacacactgtagcttctgtgaagaagcgctgtgtgacaagaatgtgt 2700  
|||||  
DB 2641 cgttacaagctgtgagacacactgtagcttctgtgaagaagcgctgtgtgacaagaatgtgt 2700  
QY 2701 caaaaacgcttctgtgcacatcccaacaacgactgcgaattgatatacaactaagagcttatca 2760  
|||||  
DB 2701 caaaaacgcttctgtgcacatcccaacaacgactgcgaattgatatacaactaagagcttatca 2760  
QY 2761 gttgaattcaaatgaacatgatttagcggaagttaaacctgtgagacaactgtgtttaagaat 2820  
|||||  
DB 2761 gttgaattcaaatgaacatgatttagcggaagttaaacctgtgagacaactgtgtttaagaat 2820  
QY 2821 gcagaagtgtaatgcgttagctgtgactgtlaacagacattagaaggttcttacaataaatt 2880

DB 2821 gcaagcaggttaatgcygttagctgtgactgttacaacgacattagaaggttctacaataattc 2880  
|||||  
QY 2881 gtaattactccatctcaagaattaaagaactgtgcacagtttactcctgtlaacaattgcaggt 2940  
|||||  
DB 2881 gtaattactccatctcaagaattaaagaactgtgcacagtttactcctgtlaacaattgcaggt 2940  
QY 2941 gtgagagataaagtaggtlaacacaactcttaataacttaactcgttcaagactgtatct 3000  
|||||  
DB 2941 gtgagagataaagtaggtlaacacaactcttaataacttaactcgttcaagactgtatct 3000  
QY 3001 ggcgaatcccaacgcttatcttcaatcagcatgttgctgcagcgttgatgaagttgacggttct 3060  
|||||  
DB 3001 ggcgaatcccaacgcttatcttcaatcagcatgttgctgcagcgttgatgaagttgacggttct 3060  
QY 3061 aaaaacatttacaatttgatctcagcagatcagttcccaaacccaacatacactcttaagaag 3120  
|||||  
DB 3061 aaaaacatttacaatttgatctcagcagatcagttcccaaacccaacatacactcttaagaag 3120  
QY 3121 gctgcaggaacttcaatttactaattcaactttagtlaaagtlaaataatgaataaaca 3180  
|||||  
DB 3121 gctgcaggaacttcaatttactaattcaactttagtlaaagtlaaataatgaataaaca 3180  
QY 3181 tacaanaattgtatctccacaagaagtgtaaacacttgacagagtttaactaataatgagttaga 3240  
|||||  
DB 3181 tacaanaattgtatctccacaagaagtgtaaacacttgacagagtttaactaataatgagttaga 3240  
QY 3241 gtltcaaaagatttccaacactgtgtactgaatattgtatagacaaaagttaacatcacacaaggt 3300  
|||||  
DB 3241 gtltcaaaagatttccaacactgtgtactgaatattgtatagacaaaagttaacatcacacaaggt 3300  
QY 3301 tctgtgttactgtacgaagtaaaactgtctctagttagtgcggttggttcaatggaatgtgaaca 3360  
|||||  
DB 3301 tctgtgttactgtacgaagtaaaactgtctctagttagtgcggttggttcaatggaatgtgaaca 3360  
QY 3361 agctatactcaagagatgctgcagacaacagactcgtgtcgttaactgactcgttgcggag 3420  
|||||  
DB 3361 agctatactcaagagatgctgcagacaacagactcgtgtcgttaactgactcgttgcggag 3420  
QY 3421 ccaggttgccttcaattctcagaaggtatcgaatttaacgaatgcnaactgtgacagtaca 3480  
|||||  
DB 3421 ccaggttgccttcaattctcagaaggtatcgaatttaacgaatgcnaactgtgacagtaca 3480  
QY 3481 aatattactgattgataaaactgttgaagttatttccaagaagaggttgaacgagacat 3540  
|||||  
DB 3481 aatattactgattgataaaactgttgaagttatttccaagaagaggttgaacgagacat 3540  
QY 3541 gatgcaggtgtactaagagagacattgaattaaacaagttactcctttagtactgtat 3600  
|||||  
DB 3541 gatgcaggtgtactaagagagacattgaattaaacaagttactcctttagtactgtat 3600  
QY 3601 aacagaagactataaagattgttgaagtgtggaattgaagaatgcagcaggttaattgttga 3660  
|||||  
DB 3601 aacagaagactataaagattgttgaagtgtggaattgaagaatgcagcaggttaattgttga 3660  
QY 3661 gatactattacattctatattaaagtaa 3687  
|||||  
DB 3661 gatactattacattctatattaaagtaa 3687

RESUME 2  
AAK22748  
ID AAK22748 standard; DNA; 3687 BP.  
XX  
AC AAK22748;  
XX  
DT 24- AUG-1999 (first entry)  
XX  
DE B steatothermophilus sbas DNA.  
XX  
KW sbas protein; S-layer protein; Gram-negative; prokaryotic host cell;  
KW integration; cytoplasmic membrane; secretion; periplasmic space; toxin;  
KW eukaryotic host cell; vaccine; adjuvant; immunogenic epitope; luciferase;



Db 1141 tttygaactaagtgaacaaacaaactctgtlaaacttagcagcaggttacttcgcacact 1200  
QY 1201 gacgatacttaacagtagtatctgaagaagtgttagcacttgaactgttaaacacagctcg 1260  
Db 1201 gaagataacttaacagtagtatctgaagaagtgttagcacttgaactgttaaacacagctcg 1260  
QY 1261 aacgttactattacaagatgttgaacgtggaacacgcatlccagtaattgcatctacttc 1320  
Db 1261 aacgttactattacaagatgttgaacgtggaacacgcatlccagtaattgcatctacttc 1320  
QY 1321 ggtcttacaattactattactcgttaaaaagaagcgttagtaactgtgttaacaataaact 1380  
Db 1321 ggtcttacaattactattactcgtttaaagaagcgttagtaactgtgttaacaataaact 1380  
QY 1381 gctatcaataagtttaaaaacttaactcgtgttaacatgcagaagcttacgagtttagtgc 1440  
Db 1381 gctatcaataagtttaaaaacttaactcgtgttaacatgcagaagcttacgagtttagtgc 1440  
QY 1441 actgcacaacgcatacagcaccaactgtgtgtacacgcgtcctactactttaggttgtaaacact 1500  
Db 1441 actgcacaacgcatacagcaccaactgtgtgtacacgcgtcctactactttaggttgtaaacact 1500  
QY 1501 ttacttaccgtgtcctcttacaacaaatgtttgggttaaatgtgcgtggttggtgaatgaa 1560  
Db 1501 ttacttaccgtgtcctcttacaacaaatgtttgggttaaatgtgcgtggttggtgaatgaa 1560  
QY 1561 gctgcgaactattatctcgtgtcttcaatlcacaaacaaagcttgccttaagttaagtcgaag 1620  
Db 1561 gctgcgaactattatctcgtgtcttcaatlcacaaacaaagcttgccttaagttaagtcgaag 1620  
QY 1621 tctacttagtgcataactttgttattagttgaaagaacatcgtgtacagttgtgtcttc 1680  
Db 1621 tctacttagtgcataactttgttattagttgaaagaacatcgtgtacagttgtgtcttc 1680  
QY 1681 gaacttaaaataaatgcagacgcttaaaatggttaacttagtgcacaaagcgagacctaata 1740  
Db 1681 gaacttaaaataaatgcagacgcttaaaatggttaacttagtgcacaaagcgagacctaata 1740  
QY 1741 gaaataacacatctataaataccaatlaaaaaagcgttgaagtcgagtaaaagtattgaa 1800  
Db 1741 gaaataacacatctataaataccaatlaaaaaagcgttgaagtcgagtaaaagtattgaa 1800  
QY 1801 tttagcactgtttaacgagaagaacatatgagtctcaaaaactcaaaacttaactgtctctaca 1860  
Db 1801 tttagcactgtttaacgagaagaacatatgagtctcaaaaactcaaaacttaactgtctctaca 1860  
QY 1861 gttatttagcgtlaaagcttcaaaaatgvcagcgtgcgtgataaagaatacgtgaagtcgaag 1920  
Db 1861 gttatttagcgtlaaagcttcaaaaatgvcagcgtgcgtgataaagaatacgtgaagtcgaag 1920  
QY 1921 tttagcgttaagttctccaagaagaatttaataactttaatgtctcaaacggtttccgggttagc 1980  
Db 1921 tttagcgttaagttctccaagaagaatttaataactttaatgtctcaaacggtttccgggttagc 1980  
QY 1981 acaatcacatagcgttcaaaatgtgtgtagttcaaaagcgggtgcgaacttactgtctctaca 2040  
Db 1981 acaatcacatagcgttcaaaatgtgtgtagttcaaaagcgggtgcgaacttactgtctctaca 2040  
QY 2041 gcaagtgacatcaatctccagctaggtgtgaagcgggttacctgcgtcacagatggaacatacaaa 2100  
Db 2041 gcaagtgacatcaatctccagctaggtgtgaagcgggttacctgcgtcacagatggaacatacaaa 2100  
QY 2101 gttgaagaagttgcgttaaaccaattagaagcttaacaaaggttacaaatagtagttcgtcgt 2160  
Db 2101 gttgaagaagttgcgttaaaccaattagaagcttaacaaaggttacaaatagtagttcgtcgt 2160  
QY 2161 aagaagtgacaacagctcctgtttaaagaatgctgcacaatgcacaatcttagcaacttaactat 2220  
Db 2161 aagaagtgacaacagctcctgtttaaagaatgctgcacaatgcacaatcttagcaacttaactat 2220  
QY 2221 atctatatacttaacaactgaaggtcaagaacgtlaacagcaccaacggtttacaagaatc 2280  
Db 2221 atctatatacttaacaactgaaggtcaagaacgtlaacagcaccaacggtttacaagaatc 2280

QY 2281 aagaagttatctttaaagaacgctgtgacgttactactaacttaacgaaactgtgacaggt 2340  
Db 2281 aagaagttatctttaaagaacgctgtgacgttactactaacttaacgaaactgtgacaggt 2340  
QY 2341 caaaaattcacatlcacatcttaagcagaagaattaaaaactctagttggttcttagttggt 2400  
Db 2341 caaaaattcacatlcacatcttaagcagaagaattaaaaactctagttggttcttagttggt 2400  
QY 2401 ggtcaaaagtaactgttcgagaagaattacaacaaacggatgggttaaatgctgtgtactggaac 2460  
Db 2401 ggtcaaaagtaactgttcgagaagaattacaacaaacggatgggttaaatgctgtgtactggaac 2460  
QY 2461 actgtatcaagtctcctcaagaacagatgcgaactggttaaaatgaacagctgtgtgttaca 2520  
Db 2461 actgtatcaagtctcctcaagaacagatgcgaactggttaaaatgaacagctgtgtgttaca 2520  
QY 2521 ttaactgtgtctgaacaaatacgaacaaagatgcgaactgtgtctggttagtagaataagttct 2580  
Db 2521 ttaactgtgtctgaacaaatacgaacaaagatgcgaactgtgtctggttagtagaataagttct 2580  
QY 2581 tctactatgagaatgt 2640  
Db 2581 tctactatgagaatgt 2640  
QY 2641 cgttacaacagcctggagacacacgtgtagctcctcgtgaaagcgtgtgtgtgtgtgtgtgtgt 2700  
Db 2641 cgttacaacagcctggagacacacgtgtagctcctcgtgaaagcgtgtgtgtgtgtgtgtgtgt 2700  
QY 2701 caaaacgctctcgtcgtcatcccaacaaagacatgcgaactgtatatacactaaagacttata 2760  
Db 2701 caaaacgctctcgtcgtcatcccaacaaagacatgcgaactgtatatacactaaagacttata 2760  
QY 2761 gttgaattccaatgaacatgatttagcgaagtttaaacctgagacaacatcgtgtttaaagat 2820  
Db 2761 gttgaattccaatgaacatgatttagcgaagtttaaacctgagacaacatcgtgtttaaagat 2820  
QY 2821 gtcagcaggtatagtcgt 2880  
Db 2821 gtcagcaggtatagtcgt 2880  
QY 2881 gttacacatccatccaaagatlaaaagcgtgtgacagtttactcgttlaacaactgtgcgt 2940  
Db 2881 gttacacatccatccaaagatlaaaagcgtgtgacagtttactcgttlaacaactgtgcgt 2940  
QY 2941 gttgaagataaagtaggtlaacacacatcttaaaatlaactcgtgtcgaagactgtatct 3000  
Db 2941 gttgaagataaagtaggtlaacacacatcttaaaatlaactcgtgtcgaagactgtatct 3000  
QY 3001 gtcgaatcccaacgttatcttcaatccagcatgtgcgaaggtgcagtttaacgtttgacggttct 3060  
Db 3001 gtcgaatcccaacgttatcttcaatccagcatgtgcgaaggtgcagtttaacgtttgacggttct 3060  
QY 3061 aaaaacattacaattgaatccagcatcaggtcccaaacccaacacatccatcttaagaag 3120  
Db 3061 aaaaacattacaattgaatccagcatcaggtcccaaacccaacacatccatcttaagaag 3120  
QY 3121 gctgcaggaactcattacttaacttaacttaactttagtaaatgtaaatgaataaataaaca 3180  
Db 3121 gctgcaggaactcattacttaacttaacttaactttagtaaatgtaaatgaataaataaaca 3180  
QY 3181 tacaacaaatgttatccacaagaaggtgtaaacactgtgacgaggttttctcaataatagtttagca 3240  
Db 3181 tacaacaaatgttatccacaagaaggtgtaaacactgtgacgaggttttctcaataatagtttagca 3240  
QY 3241 gtttcaaaaagatcttcaaacctgttactgtatgtatgtagcaagaagtacatctcaacaaggt 3300  
Db 3241 gtttcaaaaagatcttcaaacctgttactgtatgtatgtagcaagaagtacatctcaacaaggt 3300  
QY 3301 tctgtgttactatgacgaagtaaaacctgtccttagtagcgttgtgttcatatggaatggaaca 3360  
Db 3301 tctgtgttactatgacgaagtaaaacctgtccttagtagcgttgtgttcatatggaatggaaca 3360

```

QY 3361 agctatactcagaatcgtcagcaacaacagactcgtctcgtacgtcgttcgtcgag 3420
   |||||||
Db 3361 agctatactcagaatcgtcagcaacaacagactcgtctcgtacgtcgttcgtcgag 3420
QY 3421 ccagttgccccttcaatctcagaaggtatcgattaaacgaatgcaactgtgacaagtaaca 3480
   |||||||
Db 3421 ccagttgccccttcaatctcagaaggtatcgattaaacgaatgcaactgtgacaagtaaca 3480
QY 3481 aatattacgatgatgaataaactgttgaagttatttcaaaagagatgttaacgcagccat 3540
   |||||||
Db 3481 aatattacgatgatgaataaactgttgaagttatttcaaaagagatgttaacgcagccat 3540
QY 3541 gatcgagtgctactaagaagacattagtaattaaacagacttactccttagtactgat 3600
   |||||||
Db 3541 gatcgagtgctactaagaagacattagtaattaaacagacttactccttagtactgat 3600
QY 3601 aacagcaagaactataagattgttgaagtggaagtaagaatgacaggttaagtgtga 3660
   |||||||
Db 3601 aacagcaagaactataagattgttgaagtggaagtaagaatgacaggttaagtgtga 3660
QY 3661 gatatactacattctatattaaagta 3687
   |||||||
Db 3661 gatatactacattctatattaaagta 3687

```

```

RESULT 3
AAA71797
ID AAA71797 standard; DNA; 3687 BP.
XX AAA71797;
AC AAA71797;
XX 08-JAN-2001 (first entry)
XX DE B. stearothermophilus SDSA DNA.
XX DE S-layer gene; sbSA; antibacterial; vaccine; adjuvant; bioreactor;
XX KM poly(hydroxylalkanoate) synthesis; ds.
XX OS Bacillus stearothermophilus.
XX FH Key Location/Qualifiers
FH CDS 1..3687
FT /*tag= a
FT /*product= "sbSA"
FT sig_peptide 1..93
FT /*tag= b
FT mat_peptide 94..3684
FT /*tag= c
XX DE19903345-A1.
XX PM 03-AUG-2000.
XX PD 28-JAN-1999; 99DE-1003345.
XX PF 28-JAN-1999; 99DE-1003345.
XX PK 28-JAN-1999; 99DE-1003345.
XX PA (LUBITZ) LUBITZ W.
XX PI Lubitz W;
XX DR WPI: 2000-533868/49.
XX DR P-PSDB: AAB10625.
XX PT Host cell, useful e.g. as bioreactor for production of
XX PT poly(hydroxylalkanoate), containing two or more recombinant
XX PT polypeptides, with at least one in carrier-bound form -
XX PS Disclosure; Page 8-12; 26pp; German.
XX CC This invention describes a novel host cell (A) comprising at least two
XX CC functional recombinant polypeptides (I), at least one being in carrier
XX CC bound form. The products of the invention have antibacterial activity.

```

(A), or, where bacterial, their ghosts (B), are useful as vaccines or adjuvants (specifically for presentation of immunogenic epitopes of pathogens or autologous immunostimulatory polypeptides, e.g. cytokines), or preferably, as enzyme reactors for performing a cascade of reactions, specifically synthesis of poly(hydroxylalkanoate). Localization of individual (I), specifically enzymes, in separate cellular compartments avoids adverse reactions between products and substrates, when being used as bioreactors. (I) can be produced in carrier-bound form without loss of function. This sequence encodes the Bacillus stearothermophilus S-layer protein sbSA which is used to illustrate the method of the invention.

Sequence 3687 BP; 1316 A; 660 C; 715 G; 996 T; 0 other;

Query Match 100.0%; Score 3687; DB 21; Length 3687;  
 Best Local Similarity 100.0%; Pred. No. 0;  
 Matches 3687; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

```

QY 1 atggtatggaataaagctgtgaactagcaacagcaagtgctattgcaagtgcaatt 60
   |||||||
Db 1 atggtatggaataaagctgtgaactagcaacagcaagtgctattgcaagtgcaatt 60
QY 61 gtgcgtgcaatcccaaacgctctcgaagcggtacagatgtgcaacagtagtaagccaa 120
   |||||||
Db 61 gtgcgtgcaatcccaaacgctctcgaagcggtacagatgtgcaacagtagtaagccaa 120
QY 121 gcaaaagcagcttcaaaaagcatatactactacagcctacagtaacggaactgtt 180
   |||||||
Db 121 gcaaaagcagcttcaaaaagcatatactactacagcctacagtaacggaactgtt 180
QY 181 gaattcccaaacattaaacgatgatatgtctgataatacaacaagcgaaacagataccgt 240
   |||||||
Db 181 gaattcccaaacattaaacgatgatatgtctgataatacaacaagcgaaacagataccgt 240
QY 241 gatggtgtgacattgtgtataaagaagtggtgcgaaanaagaagctactactgtat 300
   |||||||
Db 241 gatggtgtgacattgtgtataaagaagtggtgcgaaanaagaagctactactgtat 300
QY 301 ttacaaaagaatatgaacttaacgttttcaagaacaaaccccaaatctgtcgcaactgt 360
   |||||||
Db 301 ttacaaaagaatatgaacttaacgttttcaagaacaaaccccaaatctgtcgcaactgt 360
QY 361 gtacgaacttacaatcgatgtcttaacaactatgcacaacaaatagacgaatgtgcgaag 420
   |||||||
Db 361 gtacgaacttacaatcgatgtcttaacaactatgcacaacaaatagacgaatgtgcgaag 420
QY 421 ctgaaggtcgtggttcaagaacaaagattagaanaagcgagaacataactatacaaat 480
   |||||||
Db 421 ctgaaggtcgtggttcaagaacaaagattagaanaagcgagaacataactatacaaat 480
QY 481 ccttatgaataataaactcgcacagtcatttagatcgtglatatggttaaacactcgt 540
   |||||||
Db 481 ccttatgaataataaactcgcacagtcatttagatcgtglatatggttaaacactcgt 540
QY 541 gatttaactcgtctacatttaagaacaaagcacaagaactcgcgacagcttaattat 600
   |||||||
Db 541 gatttaactcgtctacatttaagaacaaagcacaagaactcgcgacagcttaattat 600
QY 601 gatattaccgttgcgaatgaagcgcggaagtaacgaagcgtgtgaagcaggaattta 660
   |||||||
Db 601 gatattaccgttgcgaatgaagcgcggaagtaacgaagcgtgtgaagcaggaattta 660
QY 661 gacaaagctaaagctgtcttgaatcaatcaatcaatcaatcaatcaatcaatcaat 720
   |||||||
Db 661 gacaaagctaaagctgtcttgaatcaatcaatcaatcaatcaatcaatcaatcaat 720
QY 721 ttcaaaactgaactaacaagaagtagcgaataaagaacttagatgcagatgaagctgcgt 780
   |||||||
Db 721 ttcaaaactgaactaacaagaagtagcgaataaagaacttagatgcagatgaagctgcgt 780
QY 781 actccaaaagtgtgaagtgtaagtgatgaatcaactcaaaaagaagcgtttgaattaa 840
   |||||||
Db 781 actccaaaagtgtgaagtgtaagtgatgaatcaactcaaaaagaagcgtttgaattaa 840

```



Db	3001	gcgagatccaaagttatcttcaacccagcatgtctgcgaagggcgacgttaaaagttgaccgtttct	3060
Oy	3061	aaaacatltacaattgaattcagcgatltcaagltccaaaaccacaatactcttaagaag	3120
Db	3061	aaaacaatlcaaatltgattccagcgattccagttcccaaacccacaatcattcttaagaag	3120
Oy	3121	gtctacggaacttcatttacttaattacacttttagttaaatgtrtaaatgaataataaaca	3180
Db	3121	gtctacggaacttcatttacttaattacacttttagttaaatgaataataataaaca	3180
Oy	3181	lacaanaatlgbatbccacaagaagtgtaaacacttgacagagtttactccaalagtttagca	3240
Db	3181	tacaanaatlgtattccacaagaagtgtaaacacttgacagagtttactccaalagtttagca	3240
Oy	3241	gtttcaanaagatttccaactgtgtactgatatattgataagcaaaagttacatttcacaggt	3300
Db	3241	gtttcaanaagatttccaactgtgtactgatatattgataagcaaaagttacatttcacaggt	3300
Oy	3301	tcgttctacttgacggaagtaaaaccctgcctcagtagagcggttggttctatggaaatgaaca	3360
Db	3301	tcgttctacttgacggaagtaaaaccctgcctcagtagagcggttggttctatggaaatgaaca	3360
Oy	3361	agctatactccaagatgtctgcagcaacaacgactcggltctgtatgcgttactcgttgcgag	3420
Db	3361	agctatactccaagatgtctgcagcaacaacgactcggltctgtatgcgttactcgttgcgag	3420
Oy	3421	ccagttccgcttcaattcttcaagaagttatcgattttagcaatgcgaactggtacagttaca	3480
Db	3421	ccagttccgcttcaattcttcaagaagttatcgattttagcaatgcgaactggtacagttaca	3480
Oy	3481	aaatctactgtagtaaaactgtttagagttatlttccaagaagagagtgtagacgcgaacocat	3540
Db	3481	aaatctactgtagtaaaactgtttagagttatlttccaagaagagagtgtagacgcgaacocat	3540
Oy	3541	gattcgagtgtagtaagaaggacatagtaaataaacacagttaccctttagttactgatt	3600
Db	3541	gattcgagtgtagtaagaaggacatagtaaataaacacagttaccctttagttactgatt	3600
Oy	3601	aacagcaagacttlaaagatgtgtgaagtggaagttaaagaatgcagcaggttaatgttga	3660
Db	3601	aacagcaagacttlaaagatgtgtgaagtggaagttaaagaatgcagcaggttaatgttga	3660
Oy	3661	gatactattacattctatatattaagtaa	3687
Db	3661	gatactattacattctatatattaagtaa	3687
RESULT 4			
AT08695	ID	AT08695 standard; DNA; 3832 BP.	
XX	AC		
XX	AA08695;		
XX	AT	15-JUL-1996 (first entry)	
XX	DE	sbsA gene encoding S-layer protein.	
XX	XX	sbsA gene; S-layer; cell surface layer; expression; ss	
OS	XX	Bacillus stearothermophilus.	
XX	XX		
FH	Key	location/Qualifiers	
FT	CDS	37..3723	
FT	RBS	/*lag- a	
FT		19..25	
FT		/*lag- b	
FT	5'UTR	1..36	
FT		/*lag- c	
FT	3'UTR	3723..3832	
FT		/*lag- d	
FT		37..126	
FT	sig_peptide	/*lag- e	

FT	mat_peptide	/note="Claim 1"	
FT		127..3720	
FT		/*tag= f	
FT		/note="Claim 3"	
FT	stem_loop	3769..3806	
FT		/*tag= g	
FT		/note="terminator"	
XX			
PN	DE4425527-A1.		
XX			
XX	25-JAN-1996.		
XX			
PF	19-JUL-1994;	94DE-4425527.	
XX			
PR	19-JUL-1994;	94DE-4425527.	
XX			
PA	(VOGE-) VOGELBUSCH GMBH.		
XX			
PI	Lubitz W;		
XX			
DR	WPI: 1996-077933/09.		
DR	P-PSDB: AAR77673.		
XX			
PT	Nucleic acid encoding signal peptide of Bacillus stearothermophilus		
PT	S-layer protein - which has a lysine content of at least 10 per		
PT	cent.		
XX			
PS	Disclosure: Page 6-7; 12pp; German.		
XX			
CC	The claimed signal peptide encoding sequence (see tag e of AAR08695)		
CC	is pref. operably linked at the 3' end to a protein encoding		
CC	sequence. The protein is pref. the S-layer protein (see tag f of		
CC	AAR08695). At the 5' end, the signal peptide encoding sequence is		
CC	pref. linked to an expression control sequence, pref. the sequence		
CC	given in AAR08696.		
XX			
SQ	Sequence 3832 BP; 1355 A; 686 C; 749 G; 1042 T; 0 other:		
Query Match 100.0%; Score 3687; DB 17; Length 3832;			
Best Local Similarity 100.0%; Pred. No. 0;			
Matches 3687; Conservative 0; Mismatches 0; Indels 0; Gaps 0;			
QY	1 atggtatgagaaaaagctgttgaactagcaacagcaagtgtctatgcagcaagtgcattt	60	
DB	37 atggtatgagaaaaagctgttgaactagcaacagcaagtgtctatgcagcaagtgcattt	96	
QY	61 gtcgcgtgcgaatcccaaacgctcttgaagcggtacaagtgtatgtagcaacagtagtagccaa	120	
DB	97 gtcgcgtgcgaatcccaaacgctcttgaagcggtacagatgtatgtagcaacagtagtagccaa	156	
QY	121 gcaaaagcagttcaaaaaagcatactacttaccagcctacacagtagtaacgtaaaactggt	180	
DB	157 gcaaaagcagttcaaaaaagcatactacttaccagcctacacagtagtaacgtaaaactggt	216	
QY	181 gaattccccaacatataagatgtatatgtctgtgaatacaaaaagcgtaaaaaacgataacgt	240	
DB	217 gaattccccaacatataagatgtatatgtctgtgaatacaaaaagcgtaaaaaacgataacgt	276	
QY	241 gatctgcgtatgactatgtatataaagcaggttgcgcgcaaaaaagcagcttacttactgtat	300	
DB	277 gatctgcgtatgactatgtatataaagcaggttgcgcgcaaaaaagcagcttacttactgtat	336	
QY	301 ttacaaaaaagaatlgaaacttaacgttttcaaaagcaaacctctaactctgcgaaagctcgt	360	
DB	337 ttacaaaaaagaatlgaaacttaacgttttcaaaagcaaacctctaactctgcgaaagctcgt	396	
QY	361 gtagcaaaccttaactgatgtcttcaacaactatgtaaaaaaatttagaagaatttgccaaaag	420	
DB	397 gtagcaaaccttaactgatgtcttcaacaactatgtaaaaaaatttagaagaatttgccaaaag	456	
QY	421 ctatagagctgcgtcttcaagcaaaaatttagaaaaaagcagaacaaactatatacaaaaatt	480	



Db 457 ctgagagctgctgttccaagcaaaaagattagaaaaagcgaaacatactatcacaaatt 516  
QY 481 ccttctgaaatataaactcgcaagcattcttagatcggtatagtgtataaanaactcgt 540  
Db 517 ccttaagaaatataaactcgcaagcattcttagatcggtatagtgtataaanaactcgt 576  
QY 541 gatttactcgtctcaactttaaagaagcaagaacttcgcacagcttaattct 600  
Db 577 gatttactcgtctcaactttaaagaagcaagaacttcgcacagcttaattct 636  
QY 601 gatattaccgttgcgaatggaagcgcgcgaagtacaaagcgtctgtgaaagcaggcaatca 660  
Db 637 gatattaccgttgcgaatggaagcgcgcgaagtacaaagcgtctgtgaaagcaggcaatca 696  
QY 661 gacaaagcctaaagcgtgctgttatccaatccaatctacttccaaaagtacagatgct 720  
Db 697 gacaaagcctaaagcgtgctgttatccaatccaatctacttccaaaagtacagatgct 756  
QY 721 ttcaaaaactgaaactaacagaagtaagcaaaaagcattagatgcagatgaagctgcgtt 780  
Db 757 ttcaaaaactgaaactaacagaagtaagcaaaaagcattagatgcagatgaagctgcgtt 816  
QY 781 actccaaaagttgaaagtgtaagtgcgatataacactcaaaagaagctgttgaaattaaca 840  
Db 817 actccaaaagttgaaagtgtaagtgcgatataacactcaaaagaagctgttgaaattaaca 876  
QY 841 ggaagtacacggtgaaacggaactaaatatacaactttcagctgcgttcgaatgaagataca 900  
Db 877 ggaagtacacggtgaaacggaactaaatatacaactttcagctgcgttcgaatgaagataca 936  
QY 901 gtaaaacgttaaaactgtaactgtactataaagtgagcgtgaacattccatttgccttaatt 960  
Db 937 gtaaaacgttaaaactgtaactgtactataaagtgagcgtgaacattccatttgccttaatt 996  
QY 961 acgcgagatggtctcttactctacagacggaanaaactaactcgtgtgaaactccaca 1020  
Db 997 acgcgagatggtctcttactctacagacggaanaaactaactcgtgtgaaactccaca 1056  
QY 1021 ttccgaaaataatagcgagataaagaatgtaagtgatataaagaacaaaatgtgcaca 1080  
Db 1057 ttccgaaaataatagcgagataaagaatgtaagtgatataaagaacaaaatgtgcaca 1116  
QY 1081 gaattttaaagaagatgcatctcattccaagcttcgaaatgtaatgcttactcaactg 1140  
Db 1117 gaattttaaagaagatgcatctcattccaagcttcgaaatgtaatgcttactcaactg 1176  
QY 1141 ttgtgaaactaaatgtaacaaaacacctctgtaaacttaagcagcaggtactctcgacact 1200  
Db 1177 ttgtgaaactaaatgtaacaaaacacctctgtaaacttaagcagcaggtactctcgacact 1236  
QY 1201 gacggtactttaacagtgatatttgataagtggttagacccctgaaactgtaaacgctcg 1260  
Db 1237 gacggtactttaacagtgatatttgataagtggttagacccctgaaactgtaaacgctcg 1296  
QY 1261 aacgttactatatacagatgtgtgaaactggaanaacgcatccagtaattcatctactctt 1320  
Db 1297 aacgttactatatacagatgtgtgaaactggaanaacgcatccagtaattcatctactctt 1356  
QY 1321 ggtcttacaattactatactagctttaaagaagcgttagtaactcgtgtaaacataataact 1380  
Db 1357 ggtcttacaattactatactagctttaaagaagcgttagtaactcgtgtaaacataataact 1416  
QY 1381 gctatacaataatggttaaaaacatlaactggtttacaatgcaagagcttaagtggttc 1440  
Db 1417 gctatacaataatggttaaaaacatlaactggtttacaatgcaagagcttaagtggttc 1476  
QY 1441 actgcaaaacgcatcagcaccacactgtgtgtaacgctccactacttaagtggttacaact 1500  
Db 1477 actgcaaaacgcatcagcaccacactgtgtgtaacgctccactacttaagtggttacaact 1536  
QY 1501 ttactactggttctcttatacaacaaagtgttgaggtaaatgtgcgtgtgtgtgaatgaa 1560  
Db 1537 ttactactggttctcttatacaacaaagtgttgaggtaaatgtgcgtgtgtgtgaatgaa 1596

QY 1561 gctggaacttattatctctgtctccaattcacacaacagctgtgtactaagttagacgaa 1620  
Db 1597 gctggaacttattatctctgtctccaattcacacaacagctgtgtactaagttagacgaa 1656  
QY 1621 tctactttagcgtataactttgtatttagtgtaaaaagaactcgtgtacagttgtgtcttc 1680  
Db 1657 tctactttagcgtataactttgtatttagtgtaaaaagaactcgtgtacagttgtgtcttc 1716  
QY 1681 gaactaaaataatgacagcgttaaaatgtgtaactttagtgccaaaagcggaccttaaa 1740  
Db 1717 gaactaaaataatgacagcgttaaaatgtgtaactttagtgccaaaagcggaccttaaa 1776  
QY 1741 gaaaatacaatctataaataccaataatlaaaaagcgttgaagcagatlaaagtttgaa 1800  
Db 1777 gaaaatacaatctataaataccaataatlaaaaagcgttgaagcagatlaaagtttgaa 1836  
QY 1801 ttaggcactgttlaacgagaanaacataatgagttcaaaaactcaagacttaactgtcctaca 1860  
Db 1837 ttaggcactgttlaacgagaanaacataatgagttcaaaaactcaagacttaactgtcctaca 1896  
QY 1861 gttattagcgtlaacgctcttaaaaatggcgagcgtggtattaaagtaactgaaactcaaaa 1920  
Db 1897 gttattagcgtlaacgctcttaaaaatggcgagcgtggtattaaagtaactgaaactcaaaa 1956  
QY 1921 ttactggtgaagttctccaagaaatttaaatatacatttaagtctaacacccgtttgggttagc 1980  
Db 1957 ttactggtgaagttctccaagaaatttaaatatacatttaagtctaacacccgtttgggttagc 2016  
QY 1981 acaatcacalacggtlcaagttgctgtgtagttaaagcgggtgcgaactatctgtccttaca 2040  
Db 2017 acaatcacalacggtlcaagttgctgtgtagttaaagcgggtgcgaactatctgtccttaca 2076  
QY 2041 gcaagtgcacatcaatccacagctagtggtgaagcgggttactggtcacaatggaacatacaaa 2100  
Db 2077 gcaagtgcacatcaatccacagctagtggtgaagcgggttactggtcacaatggaacatacaaa 2136  
QY 2101 gtcgaagttgtgtcttaccgaattagaagcgttaaccagaaggtatcaaattagtagtgcgt 2160  
Db 2137 gtcgaagttgtgtcttaccgaattagaagcgttaaccagaaggtatcaaattagtagtgcgt 2196  
QY 2161 aaaggtgcacaacagctctcgttlaaagaatgctgcgaactgcgaatattcttgaactaactat 2220  
Db 2197 aaaggtgcacaacagctctcgttlaaagaatgctgcgaactgcgaatattcttgaactaactat 2256  
QY 2221 atctatacatttaacaaactgaaggtcaagcgttaacagcaccacaggtttacaagaatctc 2280  
Db 2257 atctatacatttaacaaactgaaggtcaagcgttaacagcaccacaggtttacaagaatctc 2316  
QY 2281 aaaggtgattctttaaagaagctgtagtgaatracagcctttagcgaagcttgaatgtagt 2340  
Db 2317 aaaggtgattctttaaagaagctgtagtgaatracagcctttagcgaagcttgaatgtagt 2376  
QY 2341 caaaaattcacatccaatttlaacgagaatlaaaaactctagtggtctttagtgggt 2400  
Db 2377 caaaaattcacatccaatttlaacgagaatlaaaaactctagtggtctttagtgggt 2436  
QY 2401 ggcgaagtaactgtgcgagaatlaacaaacacggaatgggttagatgctggtactggaaca 2460  
Db 2437 ggcgaagtaactgtgcgagaatlaacaaacacggaatgggttagatgctggtactggaaca 2496  
QY 2461 actgtatcaggtgtgtctttagacagatgcaaatggtlaaaggtaaacgctgtgtgttaca 2520  
Db 2497 actgtatcaggtgtgtctttagacagatgcaaatggtlaaaggtaaacgctgtgtgttaca 2556  
QY 2521 ttaactggtcttgacacataacgacaagaatgcaaatctgcgtctgtgtagtagtaagctct 2580  
Db 2557 ttaactggtcttgacacataacgacaagaatgcaaatctgcgtctgtgtagtagtaagctct 2616  
QY 2581 tctactatgtaagattgtcgtatgtagctgtgtaatgtaataaggaanaagatatatttaatt 2640  
Db 2617 tctactatgtaagattgtcgtatgtagctgtgtaatgtaataaggaanaagatatatttaatt 2676

QY 2641 cgttaccaacgctggagacacacitgtagctctctgtgaaagcgtcgtctgacaaagatggt 2700  
|||||  
DB 2677 cgttaccaacagctggagacacacitgtagctctctgtgaaagcgtcgtctgacaaagatggt 2736  
QY 2701 caaaacgcttctgctgcatctcccaacagcactgcaaatgtatatacaactaagaagcttatta 2760  
|||||  
DB 2737 caaaacgcttctgctgcatctcccaacagcactgcaaatgtatatacaactaagaagcttatta 2796  
QY 2761 gttgaattcaatgaagaacgatttagcgaaggttaaaccgtgaagaatactgttttaaggt 2820  
|||||  
DB 2797 gttgaattcaatgaagaacgatttagcgaaggttaaaccgtgaagaatactgttttaaggt 2856  
QY 2821 gcagcaggtaatgcygtgactgctgtaactgtaacagcattgaagcgtgtcttaacaataaatt 2880  
|||||  
DB 2857 gcagcaggtaatgcygtgactgctgtaactgtaacagcattgaagcgtgtcttaacaataaatt 2916  
QY 2881 gtattcactccatcccaagaataaagctggttacagtttactctgttaacaattgacgt 2940  
|||||  
DB 2917 gtattcactccatcccaagaataaagctggttacagtttactctgttaacaattgacgt 2976  
QY 2941 gtagagataaagtagtgaacacacatctctaataatacattactggttcaagaagcttatt 3000  
|||||  
DB 2977 gtagagataaagtagtgaacacacatctctaataatacattactggttcaagaagcttatt 3036  
QY 3001 gcgaatccaacgta tcttcaatcagcattgtgacggtgcagtttaacgcttacc 3060  
|||||  
DB 3037 gcgaatccaacgta tcttcaatcagcattgtgacggtgcagtttaacgcttacc 3096  
QY 3061 aaaaataatataatgaattcagcattcagcttcccaaacccaatacactcttaagaag 3120  
|||||  
DB 3097 aaaaataatataatgaattcagcattcagcttcccaaacccaatacactcttaagaag 3156  
QY 3121 gctgcaggaactcttactaactattacacttagtaaatgtatataatgaataataaaca 3180  
|||||  
DB 3157 gctgcaggaactcttactaactattacacttagtaaatgtatataatgaataataaaca 3216  
QY 3181 tacaaaattgtatccacaagaagtgtaacacttgaacgagtttactccaatagttagaca 3240  
|||||  
DB 3217 tacaaaattgtatccacaagaagtgtaacacttgaacgagtttactccaatagttagaca 3276  
QY 3241 gtttcaaaagatttccaactggtactgatatgtatagaagaagttaacattcaccaggt 3300  
|||||  
DB 3277 gtttcaaaagatttccaactggtactgatatgtatagaagaagttaacattcaccaggt 3336  
QY 3301 tctgttctactgacgaagtaaaacctgctctagtagcgttggttcattgatatgaaca 3360  
|||||  
DB 3337 tctgttctactgacgaagtaaaacctgctctagtagcgttggttcattgatatgaaca 3396  
QY 3361 agctatactcagatgctgcagcaacacgactcgtgctgtagctgactcgttcgagag 3420  
|||||  
DB 3397 agctatactcagatgctgcagcaacacgactcgtgctgtagctgactcgttcgagag 3456  
QY 3421 ccaggtgccttccaattctcagaagaagtatgaatttaacgaatgcaactgttcgaataaca 3480  
|||||  
DB 3457 ccaggtgccttccaattctcagaagaagtatgaatttaacgaatgcaactgttcgaataaca 3516  
QY 3481 aatatctatgatataaaactgttgaagtatttcaaaagagagtgtagacccaacat 3540  
|||||  
DB 3517 aatatctatgatataaaactgttgaagtatttcaaaagagagtgtagacccaacat 3576  
QY 3541 gatgagagtgctactaagaagagacatagtaataatacacaagcttaccctttagacttgat 3600  
|||||  
DB 3577 gatgagagtgctactaagaagagacatagtaataatacacaagcttaccctttagacttgat 3636  
QY 3601 aacagcaagactataaagattgttagtgaggttaaagatgagcagcgtaatttga 3660  
|||||  
DB 3637 aacagcaagactataaagattgttagtgaggttaaagatgagcagcgtaatttga 3696  
QY 3661 gatactatatactatataatgaaca 3687  
|||||  
DB 3697 gatactatatactatataatgaaca 3723

RESULT 5  
AAx78246  
ID AAX78246 standard; DNA; 3768 BP.  
XX  
XX  
AC AAX78246;  
XX  
DT 24-AUG-1999 (first entry)  
XX  
DE B. stearothermophilus sbSA/bacteriophage fd Gene 3 fusion protein DNA.  
XX  
XX sbSA protein; S-layer protein; Gram-negative; prokaryotic host cell;  
KW integration; cytoplasmic membrane; secretion; periplasmic space; toxin;  
KW eukaryotic host cell; vaccine; adjuvant; immunogenic epitope; luciferase;  
KW immunostimulant; cytokine; polyhydroxybutyrate; PHB synthase; body fluid;  
KW molecular laser; universal carrier molecule; monomolecular layer; Gene 3;  
KW fusion gene; ds.  
XX  
OS Synthetic.  
OS Bacteriophage fd.  
OS Bacillus stearothermophilus  
PN DE19732829-A1.  
XX  
PD 04-FEB-1999.  
XX  
XX 30-JUL-1997; 97DE-1032829.  
PF  
XX  
PR 30-JUL-1997; 97DE-1032829.  
XX  
XX (LUBI/) LUBITZ W.  
PA Lubitz W, Resch S;  
PI  
XX  
DR WPI: 1999-122189/11.  
XX  
XX  
PT Producing S-layer proteins in Gram-negative bacteria or eukaryotes -  
PT integrated into membranes or organelles or secreted into periplasma  
PR or growth medium, and nucleic acid encoding S-layer proteins with  
PT peptide insertions, used in vaccines or for enzymatic reactions  
XX  
XX  
PS Example 8; Fig 5; 34pp; German.  
XX  
XX  
CC This invention describes a method for the production of a S-layer protein  
CC (I) which comprises (a) preparing a Gram-negative prokaryotic host cell  
CC transformed with nucleic acid (ii) encoding (I), linked to a signal  
CC sequence (SS) that encodes a protein which causes at least one of (i)  
CC integration of (I) into the external or cytoplasmic membranes and/or  
CC (ii) secretion of (I) into the periplasmic space or extracellular medium,  
CC (b) culturing the cell to express (I) and (c) optionally recovering (I)  
CC from the membranes, periplasmic space and/or extracellular medium.  
CC Alternatively, a eukaryotic cell is used as host and then the SS, which  
CC is optional, promotes integration into the cytoplasmic membrane or an  
CC organelle and/or secretion into the extracellular medium. (I), and  
CC derived structures, may include a wide variety of polypeptide inserts and  
CC are useful as (i) vaccines or adjuvants (with immunogenic epitopes or  
CC immunostimulants inserts such as cytokines) (ii) as reactors (inserts  
CC are enzymes, e.g. polyhydroxybutyrate (PHB) synthase for use as a  
CC 'molecular spinnereite' for production of PBH or luciferase for use as  
CC molecular laser (when combined with substrate and oxygen)) and (iii) as  
CC universal carrier molecule (streptavidin is inserted) for use in  
CC hybridisation and immuno assays, or for selective elimination of  
CC cytokines, toxins etc. from body fluids (inserts are specific binding  
CC epitopes). In this system, heterologous (I) do not form inclusion bodies  
CC but rather monomolecular layers, and in eukaryotic cells they undergo  
CC glycosylation. This sequence encodes a fusion gene constructed from the  
CC Bacillus stearothermophilus sbSA gene and the Bacteriophage fd Gene 3  
CC signal sequence which is used in the method of the invention.  
XX  
SQ Sequence 3768 BP; 1320 A; 683 C; 733 G; 1032 T; 0 other;

Query Match 97.6%; Score 3597.4; DB 20; Length 3768;  
Best Local Similarity 99.3%; Pred. No. 0;

Matches 3613: Conservative 0; Mismatches 26; Indels 0; Gaps 0;				
Oy	49	gcaagtcgattgttcgctgcaaatccaaacgcttcgtaagcggtacagatgtagcaaca	108	
Db	19	gcaatccctttagtctgtcccttctctatgcggccagcgcgctcacagatgtagcaaca	78	
Oy	109	gtatgaagcacaagcaaaagcacagttccaanaaagcatalactatacttacgccaatacgtta	168	
Db	79	gtatgaagcacaagcaaaagcacagttccaanaaagcatalactatacttacgccaatacgtta	138	
Oy	169	acggaaactcgtgtgaattcccaaacattaaacgltatlgctgtaatacacaagaacgtaaa	228	
Db	139	acggaaactcgtgtgaattcccaaacattaaacgltatlgctgtaatacacaagaacgtaaa	198	
Oy	229	aaacgataaccgtgtagtgcgtatgacatagtataaagcgcgtggtgcgcaaaaaagcgct	288	
Db	199	aaacgataaccgtgtagtgcgtatgacatagtataaagcgcgtggtgcgcaaaaaagcgct	258	
Oy	289	tacttagctgatttacaanaaagataatgaacttaacgtttccaagccaacccctaact	348	
Db	259	tacttagctgatttacaanaaagataatgaacttaacgtttccaagccaacccctaact	318	
Oy	349	ggcgaaagtcgtgtagcaacttaccatcgaatgcttacaactatgcaacaaatlagacga	408	
Db	319	ggcgaaagtcgtgtagcaacttaccatcgaatgcttacaactatgcaacaaatlagacga	378	
Oy	409	atgcgcacaagagctagaagctcgtcttcaagcacaagaatttagaanaagcagaacatac	468	
Db	379	atgcgcacaagagctagaagctcgtcttcaagcacaagaatttagaanaagcagaacatac	438	
Oy	469	tatccaaacttccttatgaaaattaaactgcagacagttacatttagatcgcatatgt	528	
Db	439	tatccaaacttccttatgaaaattaaactgcagacagttacatttagatcgcatatgt	498	
Oy	529	aaacaactcgtgatttacttcgctcctacattttaaagcacaagcacaacttcgcgac	588	
Db	499	aaacaactcgtgatttacttcgctcctacattttaaagcacaagcacaacttcgcgac	558	
Oy	589	aaacttaattatgatatctaccgttgcgaatgaaaagcgcggaagtacagaacgtgtgaaa	648	
Db	559	aaacttaattatgatatctaccgttgcgaatgaaaagcgcggaagtacagaacgtgtgaaa	618	
Oy	649	gaagcaatttagacaanaagctaaagctgtgttgcataaactaaataatattacaanaa	708	
Db	619	gaagcaatttagacaanaagctaaagctgtgttgcataaactaaataatattacaanaa	678	
Oy	709	gtacaagatgtcttcaaaactgaactacaagaatgacgaaaaaacatlagatgacagat	768	
Db	679	gtacaagatgtcttcaaaactgaactacaagaatgacgaaaaaacatlagatgacagat	738	
Oy	769	gaagctgcgttactccaaaagtctgaagtgtaagtgcgattaacaatccaaaacaaagct	828	
Db	739	gaagctgcgttactccaaaagtctgaagtgtaagtgcgattaacaatccaaaacaaagct	798	
Oy	829	gttgaattaaacgagctacagtgtaacggaacacataaatttcaacttcagctgtgtga	888	
Db	799	gttgaattaaacgagctacagtgtaacggaacacataaatttcaacttcagctgtgtga	858	
Oy	889	aatgaagatatacgaataacgtaataactgacgtatctataaagtgcgacgttaacattcca	948	
Db	859	aatgaagatatacgaataacgtaataactgacgtatctataaagtgcgacgttaacattcca	918	
Oy	949	tttgcaccttaatacggcagagtgcttcttatacacaagcggaaaaactacacgttggat	1008	
Db	919	tttgcaccttaatacggcagagtgcttcttatacacaagcggaaaaactacacgttggat	978	
Oy	1009	gcttaactccattcggaaaataatacgcgaggtataaagtgtgtgttaaaagttttaagc	1068	
Db	979	gcttaactccattcggaaaataatacgcgaggtataaagtgtgtgttaaaagttttaagc	1038	
Oy	1069	aaaaatggcacaagaatttaaagaagaatgcattcacttccaagcttcgaatatatgtctga	1128	
Db	1039	aaaaatggcacaagaatttaaagaagaatgcattcacttccaagcttcgaatatatgtctga	1098	

Oy	1129	gttactcaagtgcttggaaactaatgttaacaacaacacacttcgttaaacttagcagcaggt	1188	
Db	1099	gttactcaagtgcttggaaactaatgttaacaacaacacacttcgttaaacttagcagcaggt	1158	
Oy	1189	acttcgaacactgacatactatttaacagtagtattgtatgaagtgtttagcacttgaact	1248	
Db	1159	acttcgaacactgacatactatttaacagtagtattgtatgaagtgtttagcacttgaact	1218	
Oy	1249	gtaaacagcttcgaagcttactattacaagatgttgaactggaacacgaltccagtaact	1308	
Db	1219	gtaaacagcttcgaagcttactattacaagatgttgaactggaacacgaltccagtaact	1278	
Oy	1309	gcacttaacttcgtttcttaacaattactattacgtttaaagaacggttagtaactgtgaaa	1368	
Db	1279	gcacttaacttcgtttcttaacaattactattacgtttaaagaacggttagtaactgtgaaa	1338	
Oy	1369	caataaaacttgtctatcaataatgttaaaaacataactgtgtacaaatgcagaagcttac	1428	
Db	1339	caataaaacttgtctatcaataatgttaaaaacataactgtgtacaaatgcagaagcttac	1398	
Oy	1429	gaattagtgcttcaactgcgaacgcatacagcacaactgtgttcaacgctcctactactta	1488	
Db	1399	gaattagtgcttcaactgcgaacgcatacagcacaactgtgttcaacgctcctactactta	1458	
Oy	1489	ggtgtgtacaacttatactactgtgtctcttacaacaaatgtttggggttaattgctgtgt	1548	
Db	1459	ggtgtgtacaacttatactactgtgtctcttacaacaaatgtttggggttaattgctgtgt	1518	
Oy	1549	ggtgtgtacaagcttggaatttatccgtgtgtcctcaattcaacaaacgaagcttgcact	1608	
Db	1519	ggtgtgtacaagcttggaatttatccgtgtgtcctcaattcaacaaacgaagcttgcact	1578	
Oy	1609	aagttagacgaactctactttagctgataacttgttgaatgttgaanaaagaatctgtgtaca	1668	
Db	1579	aagttagacgaactctactttagctgataacttgttgaatgttgaanaaagaatctgtgtaca	1638	
Oy	1669	gctgtgtccttcgaactaaataataatgcagacgcgtcaaaaatggttaacttagtgcacaaa	1728	
Db	1639	gctgtgtccttcgaactaaataataatgcagacgcgtcaaaaatggttaacttagtgcacaaa	1698	
Oy	1729	ggcgaccttaagaagaaaataacaactctacaataaataaagaagctgtgaagcttcgat	1788	
Db	1699	ggcgaccttaagaagaaaataacaactctacaataaataaagaagctgtgaagcttcgat	1758	
Oy	1789	aaaggtatttgaatttaggcactgtttaaagcgaagaaaacatatgtattcaaaactcaagactta	1848	
Db	1759	aaaggtatttgaatttaggcactgtttaaagcgaagaaaacatatgtattcaaaactcaagactta	1818	
Oy	1849	actgtctcctaagttatlagcgttaacgcttcaaaaatgvcgacgctggtatthaaagttaact	1908	
Db	1819	actgtctcctaagttatlagcgttcaacgcttcaaaaatgvcgacgctggtatthaaagttaact	1878	
Oy	1909	gaagctcaagaattttagctgtgaagctctcagaagaattttaaataatcatattatgttacaac	1968	
Db	1879	gaagctcaagaattttagctgtgaagctctcagaagaattttaaataatcatattatgttacaac	1938	
Oy	1969	gttccgggtagacaataccacatacgggtcaaggtgcgtgtgaagaacggtgtgacaactta	2028	
Db	1939	gttccgggtagacaataccacatacgggtcaaggtgcgtgtgaagaacggtgtgacaactta	1998	
Oy	2029	tctgtccttaacgaagtgacatcattccagctagtggttgaagcgggttaactgtgtcaagat	2088	
Db	1999	tctgtccttaacgaagtgacatcattccagctagtggttgaagcgggttactgtgtcaagat	2058	
Oy	2089	ggaaacataaagaatggaagaatttgcgttaacccaatttgaacggttaacaaaggtatacaatta	2148	
Db	2059	ggaaacataaagaatggaagaatttgcgttaacccaatttgaacggttaacaaaggtatacaatta	2118	
Oy	2149	gttagtctcgttgaagaatgccaacagcttcctgtttaaagaatgcttgcgaatatgcaaatattta	2208	
Db	2119	gttagtctcgttgaagaatgccaacagcttcctgtttaaagaatgcttgcgaatatgcaaatattta	2178	

2209 gcaactaatatatacatatatacatttacaactgaaagtcgaagcgttaacagcaccacagctt 2268  
|||||  
Db 2179 gcaactaaatatactatctatctatcttaactgaagtcgaagcgttaacagcaccacagctt 2238  
2265 acaaaagtaattcaaaagtcgtatctctttaaagaagcgtgtagcttaactaactacgaac 2328  
|||||  
Db 2235 acaaaagtaattcaaaagtcgtatctctttaaagaagcgtgtagcttaactaactacgaac 2298  
2325 gctgtagcaggtcaaaaattctcatctcaatttagcgaagaattaaaacctcttagtct 2388  
|||||  
Db 2295 gctgtagcaggtcaaaaattctcatctcaatttagcgaagaattaaaacctcttagtct 2358  
2389 tctttagtgggtgagcaaaagtaactgctgcgaagaattacaacaacagcgtgtagtct 2448  
Db 2359 tctttagtgggtgagcaaaagtaactgctgcgaagaattacaacaacagcgtgtagtct 2418  
2449 ggtactggaacaacacgttatcagttgctccttaagaacatgcaaatggttaagtaaacgt 2508  
Db 2419 ggtactggaacaacacgttatcagttgctccttaagaacatgcaaatggttaagtaaacgt 2478  
2509 gctgtagtatacttaactgctcttgacaataacgaagaagtcgaagattgctgtagt 2568  
2479 gctgtagtatacttaactgctcttgacaataacgaagaagtcgaagattgctgtagt 2538  
2565 gtagataagctcttctactgtagaagtcgtgtagtctgtagtaagttaagaagaaaa 2628  
Db 2535 gtagataagctcttctactgtagaagtcgtgtagtctgtagtaagttaagaagaaaa 2598  
2629 gatatttaattcgtttacacacagctggaagacacagctgtagtctgtagtaagctgtagt 2688  
Db 2595 gatatttaattcgtttacacacagctggaagacacagctgtagtctgtagtaagctgtagt 2658  
2689 gacaaagatgtagcaaaaacgctctgtagcatctccacaacagcgtgcaattgatalaacat 2748  
Db 2659 gacaaagatgtagcaaaaacgctctgtagcatctccacaacagcgtgcaattgatalaacat 2718  
2749 aagaagcttatctggtgaattcaatgaataactgattagcgaagaattaaacctgagaacatc 2808  
Db 2719 aagaagcttatctggtgaattcaatgaataactgattagcgaagaattaaacctgagaacatc 2778  
2809 gctgttaaagaatgtagcagcagtagatcgtagtctgtagtcaacagcattagacgattct 2868  
Db 2779 gctgttaaagaatgtagcagcagtagatcgtagtctgtagtcaacagcattagacgattct 2838  
2865 acaaataaattgttatctccatctccatctcaagaattaaaagcgtgtagtcaattactgtga 2928  
Db 2835 acaaataaattgttatctccatctccatctcaagaattaaaagcgtgtagtcaattactgtga 2898  
2925 acaattgacggtgtagagagaataagtaggtaacaacaatctcttaataatactctcgttc 2988  
Db 2895 acaattgacggtgtagagagaataagtaggtaacaacaatctcttaataatactctcgttc 2958  
2989 aagaagcttatctgtagaattcaacggttatcttcaatcagatgtagcgtgtagcgttaac 3048  
Db 2959 aagaagcttatctgtagaattcaacggttatcttcaatcagatgtagcgtgtagcgttaac 3018  
3049 gctgacggttcaaaaacaattacaattgaattcaacgtagcgttcccaaccacaacac 3108  
Db 3019 gctgacggttcaaaaacaattacaattgaattcaacgtagcgttcccaaccacaacac 3078  
3109 actcttaagaagcgtgtagaagcgttaacttaacttaacttaacttaacttaacttaact 3168  
Db 3079 actcttaagaagcgtgtagaagcgttaacttaacttaacttaacttaacttaacttaact 3138  
3169 gaaaataaacaatacaaaaattgattcccaagaagtcgtaacacgttgaagattactca 3228  
Db 3139 gaaaataaacaatacaaaaattgattcccaagaagtcgtaacacgttgaagattactca 3198  
3229 tatgtagtagcagcttcaaaaagatttcaaacgtgtagcgtatgtagatgtagcaagaattaca 3288  
Db 3199 tatgtagtagcagcttcaaaaagatttcaaacgtgtagcgtatgtagatgtagcaagaattaca 3258  
3289 ttcatcaacaggttctgtagtactgtagcgaagtaaaacctgtagtagcgttgtgtca 3348

|||||  
Db 3259 ttcatcaacaggttctcgtttagtactgtagcgaagtaaaaacctgtagtagcgttgtgtca 3318  
3345 tggaaatggaacaagaattatctcaagatgctgcagcaacagcattcgtctgtagtgaac 3408  
|||||  
Db 3319 tggaaatggaacaagaattatctcaagatgctgcagcaacagcattcgtctgtagtgaac 3378  
3409 ttcgttgcggaagcaggttgccttcaattcagagaagtagatcgattttaaagcgaatcaact 3468  
Db 3379 ttcgttgcggaagcaggttgccttcaattcagagaagtagatcgattttaaagcgaatcaact 3438  
3469 gtagaagtaacaataattatctgtagtaaaactgttgaagtatttcaaaaagagtgta 3528  
Db 3439 gtagaagtaacaataattatctgtagtaaaactgttgaagtatttcaaaaagagtgta 3498  
3529 gacgcagacacatgtagcaggtgctctactaaggagacatttagtaataacacgaattactct 3588  
Db 3499 gacgcagacacatgtagcaggtgctctactaaggagacatttagtaataacacgaattactct 3558  
3589 ttagtactgtagtaacaagcagaactataagatggttgaagtcggaagttaaagtagcaaga 3648  
Db 3559 ttagtactgtagtaacaagcagaactataagatggttgaagtcggaagttaaagtagcaaga 3618  
3649 ggtaatgttgcagataactattacattctataagtaa 3687  
Db 3619 ggtaatgttgcagataactattacattctataagtaa 3657  
RESULT 6  
AAx78245  
ID AAx78245 standard; DNA; 4988 BP.  
XX  
XX AAx78245;  
XX  
DT 24-AUG-1999 (first entry)  
XX  
DE B. stearothermophilus sbSA/male fusion protein DNA sequence.  
XX  
XX sbSA protein; S-layer protein; Gram-negative; prokaryotic host cell;  
KW integration; cytoplasmic membrane; secretion; periplasmic space; toxin;  
KW eukaryotic host cell; vaccine; adjuvant; immunogenic epitope; luciferase;  
KW immunostimulant; cytokine; polyhydroxybutyrate; PHB synthase; body fluid;  
KW molecular laser; universal carrier molecule; monomolecular layer;  
KW fusion protein; male; ss.  
XX  
OS Synthetic.  
OS Bacillus stearothermophilus.  
XX  
PN DE19732829-A1.  
XX  
PD 04-FEB-1999.  
XX  
PF 30-JUL-1997; 97DE-1032829.  
XX  
PR 30-JUL-1997; 97DE-1032829.  
XX  
PA (LUBI/) LUBITZ W.  
XX  
PI Lubitz W, Resch S;  
XX  
DR WPI, 1999-122189/11.  
XX  
XX  
XX Producing S-layer proteins in Gram-negative bacteria or eukaryotes -  
PT integrated into membranes or organelles or secreted into periplasm  
PT or growth medium, and nucleic acid encoding S-layer proteins with  
PT peptide insertions, used in vaccines or for enzymatic reactions  
XX  
XX Example 7; Fig 4; 34pp; German.  
XX  
XX This invention describes a method for the production of a S-layer protein  
CC (I) which comprises (a) preparing a Gram-negative prokaryotic host cell  
CC transformed with nucleic acid (II) encoding (I), linked to a signal  
CC sequence (SS) that encodes a protein which causes at least one of (i)

CC integration of (i) into the external or cytoplasmic membranes and/or  
CC (ii) secretion of (i) into the periplasmic space or extracellular medium,  
CC (b) culturing the cell to express (i) and (c) optionally recovering (i)  
CC from the membranes, periplasmic space and/or extracellular medium.  
CC Alternatively, a eukaryotic cell is used as host and then the SS, which  
CC is optional, promotes integration into the cytoplasmic membrane or an  
CC organelle and/or secretion into the extracellular medium. (i), and  
CC derived structures, may include a wide variety of polypeptide inserts and  
CC are useful as (i) vaccines or adjuvants (with immunogenic epitopes or  
CC immunostimulants inserts such as cytokines) (ii) as reactants (inserts  
CC are enzymes, e.g. polyhydroxybutyrate (PHB) synthase for use as a  
CC 'molecular spinnervette' for production of PBH or luciferase for use as  
CC a universal carrier molecule (when combined with substrate and oxygen) and (iii) as  
CC hybridisation and immuno assays, or for selective elimination of  
CC cytokines, toxins etc. from body fluids (inserts are specific binding  
CC epitopes). In this system, heterologous (i) do not form inclusion bodies  
CC but rather monomolecular layers, and in eukaryotic cells they undergo  
CC glycosylation. This sequence encodes a novel fusion protein constructed  
CC from the Bacillus stearothermophilus sbsh gene and the male gene signal  
CC sequence which is used to illustrate the method of the invention.

XX Sequence 4988 BP; 1678 A; 985 C; 1052 G; 1273 T; 0 other;

Query Match 97.5%: Score 3593.4; DB 20; Length 4988;  
Best Local Similarity 99.8%: Pred No. 0;

Matches 3597: Conservative 0; Mismatches 6; Indels 0; Gaps 0;

OY 85 gaagcgcgtacagatgtagcaacagtagtaagccaagcaaaagcacagctcaaaaaagca 144  
D 1249 ggaatccgctacagatgtagcaacagtagtaagccaagcaaaagcacagctcaaaaaagca 1308  
OY 145 tactactactaagcgcatacagtaacaggaactgtgtgaattcccaaacattaagatgta 204  
D 1309 tactactactaagcgcatacagtaacaggaactgtgtgaattcccaaacattaagatgta 1368  
OY 205 tatgtctgaatacaaaaacgcaaaaacgataccgtagtcggttagcattagatgataaa 264  
D 1369 tatgtctgaatacaaaaacgcaaaaacgataccgtagtcggttagcattagatgataaa 1428  
OY 265 gcaagctgcgcgcaaaaagcgccttacttagctgattcaaaaagataatgaacttac 324  
D 1429 gcaagctgcgcgcaaaaagcgccttacttagctgattcaaaaagataatgaacttac 1488  
OY 325 gttttcaagaagcaaaccttaactctggcggaagctcgtgtgacgaactactcgatgtttac 384  
D 1489 gttttcaagaagcaaaccttaactctggcggaagctcgtgtgacgaactactcgatgtttac 1548  
OY 385 aactatgcacaaaattagaagaattgcgcaagagctagagcgtctgttcaagcaaaa 444  
D 1549 aactatgcacaaaattagaagaattgcgcaagagctagagcgtctgttcaagcaaaa 1608  
OY 445 gatttagaanaagcgaacaatactatacaaaaatccctatgtaaaattaaactcgaca 504  
D 1609 gatttagaanaagcgaacaatactatacaaaaatccctatgtaaaattaaactcgaca 1668  
OY 505 gtcattttagatcgcgtatattgttaaaaactcgtgattacttcgccttaccatttaa 564  
D 1669 gtcattttagatcgcgtatattgttaaaaactcgtgattacttcgccttaccatttaa 1728  
OY 565 gcaaaaagcacaagaactcgcgacagcttaattatgataattacggttcaatgnaaagcg 624  
D 1729 gcaaaaagcacaagaactcgcgacagcttaattatgataattacggttcaatgnaaagcg 1788  
OY 625 cgcgaagtaacaagcgtgtgnaaagcaggaatttagacaagaactgaagctgtctgtga 684  
D 1789 cgcgaagtaacaagcgtgtgnaaagcaggaatttagacaagaactgaagctgtctgtga 1848  
OY 685 caaatcaatcaatcttaccacaaaagttaacagtgctttcaaaaactgaaactaacagaagta 744  
D 1849 caaatcaatcaatcttaccacaaaagttaacagtgctttcaaaaactgaaactaacagaagta 1908

OY 745 gcgaaaaagcattagatgcagatgaagcgtgccttactccaaaagttgaagtgtaagt 804  
D 1909 gcgaaaaagcattagatgcagatgaagcgtgccttactccaaaagttgaagtgtaagt 1968  
OY 805 gcgatttaacactaaaacaaagcgtgtgtaatttaacagcgttaccaatgnaagcaaacata 864  
D 1969 gcgatttaacactaaaacaaagcgtgtgtaatttaacagcgttaccaatgnaagcaaacata 2028  
OY 865 aaattacaactttcagctcgtcgtcaaatgaaagatacagtaaacgtaaatctagctatc 924  
D 2029 aaattacaactttcagctcgtcgtcaaatgaaagatacagtaaacgtaaatctagctatc 2088  
OY 925 tataaagttgacgttaacatttcatttgccttaataagggcaattttccttattaca 984  
D 2089 tataaagttgacgttaacatttcatttgccttaataagggcaattttccttattaca 2148  
OY 985 gacggaanaactatcactgtgtaatgccttcaactccatcgaanaataacgagataaa 1044  
D 2149 gacggaanaactatcactgtgtaatgccttcaactccatcgaanaataacgagataaa 2208  
OY 1045 gtagttagttaaggtatttaagacaaaatgcaagaatttaagaagatgatactcact 1104  
D 2209 gtagttagttaaggtatttaagacaaaatgcaagaatttaagaagatgatactcact 2268  
OY 1105 ttcaagcttcgaataatgatctgttagttagttagttagttagttagttagttagttagttagt 1164  
D 2269 ttcaagcttcgaataatgatctgttagttagttagttagttagttagttagttagttagttagt 2328  
OY 1165 acttcgttaacttaagcaacaggttaacttcgaacacgagatactttaacagtagtatt 1224  
D 2329 acttcgttaacttaagcaacaggttaacttcgaacacgagatactttaacagtagtatt 2288  
OY 1225 gataagttgttagcactcgttaaacactgtaaacagctcgaaagcttactattacagatgttga 1284  
D 2389 gataagttgttagcactcgttaaacactgtaaacagctcgaaagcttactattacagatgttga 2448  
OY 1285 actggaanaagcattcccaatgaattgcatcacttcgtgttcaacaaattactatagctta 1344  
D 2449 actggaanaagcattcccaatgaattgcatcacttcgtgttcaacaaattactatagctta 2508  
OY 1345 aaagaagcgttagttaactcgtgtaaacataataaactctgatacaataatgttaaaacata 1404  
D 2509 aaagaagcgttagttaactcgtgtaaacataataaactctgatacaataatgttaaaacata 2568  
OY 1405 actggtttaacaatgcaagaacttaacaggttagttagttagttagttagttagttagttagt 1464  
D 2569 actggtttaacaatgcaagaacttaacaggttagttagttagttagttagttagttagttagt 2628  
OY 1465 gttgctaccgctccctactactacttagttagttagttagttagttagttagttagttagttagt 1524  
D 2629 gttgctaccgctccctactactacttagttagttagttagttagttagttagttagttagttagt 2688  
OY 1525 aatgtttggtgtaaatctgctggtgtgtgtaaatgtaagcctgnaaacttatatcctgtgtct 1584  
D 2689 aatgtttggtgtaaatctgctggtgtgtgtaaatgtaagcctgnaaacttatatcctgtgtct 2748  
OY 1585 caattacaacaacagtttctactactaagttagtagaagaaacttaactttagctatatactttga 1644  
D 2749 caattacaacaacagtttctactactaagttagtagaagaaacttaactttagctatatactttga 2808  
OY 1645 tttagttgaaaagaactctgtgtaacgttgtgtcttcgtgaactaaataataagaagcgtc 1704  
D 2809 tttagttgaaaagaactctgtgtaacgttgtgtcttcgtgaactaaataataagaagcgtc 2868  
OY 1705 aaatgtgtaacttttagtgcgcaaaagcgcctttaaagaataatacaatctatacaaatcaaa 1764  
D 2869 aaatgtgtaacttttagtgcgcaaaagcgcctttaaagaataatacaatctatacaaatcaaa 2928  
OY 1765 attaaaaaagcgttgaagtcgataaaggtattgaaatgtagcagcgtgttaacgagaacaa 1824  
D 2929 attaaaaaagcgttgaagtcgataaaggtattgaaatgtagcagcgtgttaacgagaacaa 2988  
OY 1825 tatgagttcaaaactcaagaactaactgtctccttaacgattatagcgtaacgcttaaaaat 1884

Db	4069	aaagctgtgtacagtttactctctgttaacaattggaagcgtgtgtgaagatataagttagttaacaa	4129
Qy	2965	atctctaaataacattactctgttccaaagactgtlatctcgtcaatccaaagcttatcttcaalc	3024
Db	4129	atctctaataatcattactctgttccaaagactgtlatctcgtcaatccaaagcttatcttcaalc	4188
Qy	3025	agcattctgtcagcggctgtcaagtttaacgtttgacgcgtttctcaaaaacattcaattgaattcagc	3084
Db	4189	agcattctgtcagcggctgtcaagtttaacgtttgacgcgtttctcaaaaacattcaattgaattcagc	4248
Qy	3085	gattcagctcccaaaccccaacaatcacctcttaagaaagcgtgacgaagcttcatcttctat	3144
Db	4249	gattcagctcccaaaccccaacaatcacctcttaagaaagcgtgacgaagcttcatcttctat	4308
Qy	3145	tacacctttagtaaaatgtataaataatgaataaataacaatacaaaattgtlatccacaagaagt	3204
Db	4309	tacacctttagtaaaatgtataaataatgaataaataacaatacaaaattgtlatccacaagaagt	4368
Qy	3205	gttaaaccttgacagcgtttacttcaataatagtttgacagtttccaagaatttccaacgtgt	3264
Db	4369	gttaaacacttgacagcgtttacttcaataatagtttgacagcgtttccaagaatttccaacgtgt	4428
Qy	3265	actgttatcttgtaacaaagtatacatatcaacagcgtttctgtgtgtactgtacgtgaagatataa	3324
Db	4429	actgttatcttgtaacaaagtatacatatcaacagcgtttctgtgtgtactgtacgtgaagatataa	4488
Qy	3325	cctgtctctagtaaggcgtttgtgtctcatcgtgaatctgaacaagctatactcaagatgtctgaaga	3384
Db	4489	cctgtctctagtaaggcgtttgtgtgtctcatcgtgaatctgaacaagctatactcaagatgtctgaaga	4548
Qy	3385	acaacgaactcggctctgttagctgtaacctcgttctgaggacagcttgcccttcaattctcaga	3444
Db	4549	acaacgaactcggctctgttagctgtaacctcgttctgaggacagcttgcccttcaattctcaga	4608
Qy	3445	ggtatcagtttaagaagatgtgaactgtgacagctagaacaataatactagatgataaactgtt	3504
Db	4609	ggtatcagtttaagaagatgtgaactgtgacagctagaacaataatactagatgataaactgtt	4668
Qy	3505	gaagttattctcaaaagagagtgttagacgcgcagaccatgatalgcaggtgtctactaagaagaca	3564
Db	4669	gaagttattctcaaaagagagtgttagacgcgcagaccatgatalgcaggtgtctactaagaagaca	4728
Qy	3565	tttagtaattaaacacagttactcctcttagtaactgtatcgtataacagcaagaactataagaatgtt	3624
Db	4729	tttagtaattaaacacagttactcctcttagtaactgtatcgtataacagcaagaactataagaatgtt	4788
Qy	3625	gttaagttgaagttaaagatgtgaacgcagcagcgaatggttcgcagataactatacatctatattaa	3684
Db	4789	gttaagttgaagttaaagatgtgaacgcagcagcgaatggttcgcagataactatacatctatattaa	4848
Qy	3685	taa 3687	
Db	4849	taa 4851	
RESULT 7			
AAFS8252			
ID	AAFS8252 standard; DNA; 936 BP.		
XX	AAFS8252;		
XX			
DT	24-APR-2001 (first entry)		
XX			
DE	Oligonucleotide D1835.		
XX			
KM	Electron-transfer group; ETM; mismatch; genotyping;		
XX	gene expression; ss.		
OS	Synthetic.		
PN	W0200107665-A2.		
XX			
PD	01-FEB-2001		

XX 26-JUL-2000; 2000MO-US20476.  
 PF  
 XX  
 XX 26-JUL-1999; 990US-0145695.  
 PR  
 PR 17-MAR-2000; 2000US-0190259.  
 XX  
 XX  
 PA (CLIN-) CLINICAL MICRO SENSORS INC.  
 XX  
 XX  
 P1 timek RM;  
 XX  
 XX WPI; 2001-159728/16.  
 DR  
 XX  
 PT Nucleic acids containing electron-transfer group, useful as labels in  
 PT hybridization assays, e.g. for genotyping, allowing repeat analyses on  
 PT a single surface  
 XX  
 XX  
 PS Example 6; Page 127; 159pp; English.  
 XX  
 XX  
 CC The present invention relates to a composition comprising two nucleic  
 CC acids each containing an electron-transfer group (ETM) having  
 CC different redox potentials. The invention is used for electronic  
 CC detection of nucleic acids, especially of substitutions (mismatches)  
 CC and single-nucleotide polymorphisms, e.g. for genotyping,  
 CC monitoring gene expression.  
 XX  
 XX Sequence 936 BP; 4 A; 139 C; 10 G; 7 T; 776 other;

Query Match	4.1%	Score 150.6	DB 22	Length 936
Best Local Similarity	1.1%	Pred. No. 1.2e-23		
Matches	9	Conservative 508	Mismatches 272	Indels 0
				Gaps 0

Db	604	www.....	663
Oy	1680	tgacataaatatataatgcagacgctaaaatgynaacttagtgcgcaaaacggnaccttaa	1739
Db	664	www.....	723
Oy	1740	aggaatatcaatcctatacaaatcaaatlaaaaaagccttgaaagtcgcgataaagtatgca	1799
Db	724	www.....	783
Oy	1800	attaggcac	1808
Db	784	wwwggcccc	792

RESULT 8

AAFS8254

ID AAFS8254 standard; DNA; 936 BP.

AC AAFS8254;

DT 24-APR-2001 (first entry)

DE Oligonucleotide D1875.

XX

**Synthetic.**

[illegible]

XX  
XX  
XX  
PD 01-FEB-2001.  
XX  
PF 26-JUL-2000; 2000MO-US20476.  
XX  
XX 26-JUL-1999; 99US-0145695.  
PR 17-MAR-2000; 2000US-0190259.  
XX  
XX  
PA (CLIN-) CLINICAL MICRO SENSORS INC.  
XX  
XX  
PI Umek RM;  
XX  
DR WPI; 2001-159728/16.  
XX  
XX Nucleic acids containing electron-transfer group, useful as labels in  
PT hybridization assays, e.g. for genotyping, allowing repeat analyses on  
PT a single surface -  
XX  
XX  
PS Example 6; Page 127; 159pp; English.  
XX  
XX The present invention relates to a composition comprising two nucleic  
CC acids each containing an electron-transfer group (ETM) having  
CC different redox potentials. The invention is used for electronic  
CC detection of nucleic acids, especially of substitutions (mismatches)  
CC and single-nucleotide polymorphisms, e.g. for genotyping,  
CC monitoring gene expression.  
XX  
XX  
SQ Sequence 936 BP; 4 A; 144 C; 7 G; 5 T; 776 other;

```
QY 1140 gtttgaactaatgttaacaacacactctctgtaacttagcagcagtgacttgacac 1199
DB 124 ..... 183
QY 1200 tgaagatacttaacagtagtattgtataagtgtagacaccgaaactgtaacagctc 1259
DB 184 ..... 243
QY 1260 gaacgttaactattacagatggtgaaactgaaaacgaltccaagtaattgcatactctc 1319
DB 244 ..... 303
QY 1320 tggatcaataactactacgtttaaagaagcgttagtaactggtgaacaataaact 1379
DB 304 ..... 363
QY 1380 tgcatacaatagttaaaacatlaactggttacaatgcagaagcttaacagttagtgct 1439
DB 364 ..... 423
QY 1440 cactgcaaacgatacgcacacactggtgtctacgcctcctactacttggtgtgtacac 1499
DB 424 ..... 483
QY 1500 ttatctactggtctctctacacaacatgttggggtaaattggtcgtgtgtgtatga 1559
DB 484 ..... 543
QY 1560 agctggaacttattatcctggtcctcaatccaacaacgcttgctactaagttagaaga 1619
DB 544 ..... 603
QY 1620 atctacttagctgataacttgtagttagtgaagaagatcgtgacagttgtgtcttc 1679
DB 604 ..... 663
QY 1680 tgaactaaataatgtcagacgctaaatgtgtaacttagtgcacaaagcgaccttaa 1739
DB 664 ..... 723
QY 1740 agaaaaatacaatctcaatacaaaaataaaaaagcttgaagtcgcataaaggtatga 1799
DB 724 ..... 783
QY 1800 attagcgc 1808
DB 784 ..... 792
```

```
RESULT 9
AAFS8257
ID AAF58257 standard; DNA; 936 BP.
XX
AC AAF58257;
XX
XX 24-APR-2001 (first entry)
XX
DE Oligonucleotide D1954.
XX
XX Electron-transfer group; ETM; mismatch; genotyping;
XX gene expression; ss.
XX
OS Synthetic.
XX
XX MO200107665-A2.
XX
XX 01-FEB-2001.
XX
XX 26-JUL-2000; 2000MO-US20476.
XX
XX 26-JUL-1999; 99US-0145695.
XX
XX 17-MAR-2000; 2000US-0190259.
PR
```

```
XX
PA (CLIN-) CLINICAL MICRO SENSORS INC.
XX
PI Umek RM;
XX
DR WPI; 2001-159728/16.
XX
PT Nucleic acids containing electron-transfer group, useful as labels in
XX hybridization assays, e.g. for genotyping, allowing repeat analyses on
XX a single surface
XX
XX Example 6; Page 127; 159pp; English.
XX
CC The present invention relates to a composition comprising two nucleic
CC acids each containing an electron-transfer group (ETM) having
CC different redox potentials. The invention is used for electronic
CC detection of nucleic acids, especially of substitutions (mismatches)
CC and single-nucleotide polymorphisms, e.g. for genotyping,
CC monitoring gene expression.
XX
SQ Sequence 936 BP; 5 A; 142 C; 7 G; 6 T; 776 other;

Query Match 4.1%; Score 150.6; DB 22; Length 936;
Best Local Similarity 1.1%; Pred. No. 1.2e-23;
Matches 9; Conservative 508; Mismatches 272; Indels 0; Gaps 0;

QY 1020 attcgaaataacggaatataaagtagttagttaaaggtattaaagacaaaatgagcaa 1079
DB 4 ..... 63
QY 1080 agaatttaagaagatgcattcaacttcaagctcgaaatgtagttagttagttagttagt 1139
DB 64 ..... 123
QY 1140 gtttgaactaatgttaacaacacactctgtgaacttagcagcagtgacttcgcacac 1199
DB 124 ..... 183
QY 1200 tgaagatacttaacagtagtattgtataagtgtagacaccgaaactgtaacagctc 1259
DB 184 ..... 243
QY 1260 gaacgttaactattacagatggtgaaactgtgaacgaltccaagtaattgcatactctc 1319
DB 244 ..... 303
QY 1320 tggatcaataactactacgtttaaagaagcgttagtaactggtgaacaataaact 1379
DB 304 ..... 363
QY 1380 tgcatacaatagtttaaacaatlaactggttacaatgcagaagcttaacagttagtgct 1439
DB 364 ..... 423
QY 1440 cactgcaaacgatacgcacacactggtgtctacgcctcctactacttggtgtgtacac 1499
DB 424 ..... 483
QY 1500 ttatctactggtctctctacacaacatgttggggtaaattggtcgtgtgtgtatga 1559
DB 484 ..... 543
QY 1560 agctggaacttattatcctggtcctcaatccaacaacgcttgctactaagttagaaga 1619
DB 544 ..... 603
QY 1620 atctacttagctgataacttgtagttagtgaagaagatcgtgtgtgtgtgtcttc 1679
DB 604 ..... 663
QY 1680 tgaactaaataatgtcagacgctaaatgtgtaacttagtgcacaaagcgaccttaa 1739
DB 664 ..... 723
```



Df	664	www.....Cw.....
Oy	1740	agaaatacaatctataacaatatlaaaaaaggcttgagtccgataagaattga 1799
Dd	724	www.....
Oy	1800	atlagcac 1808
Dd	784	wwwggcccc 792
RESULT 10		
ID	AAFS8259	standard; DNA; 936 BP.
AC	AAFS8259;	
DT	24-APR-2001	(first entry)
DE	Oligonucleotide D2004.	
RW	Electron-transfer group; ETM; mismatch; genotyping; gene expression; ss.	
OS	Synthetic.	
PN	WO200107665-A2.	
PD	01-FEB-2001.	
PF	26-JUL-2000; 2000WO-US20476.	
PR	26-JUL-1999; 99US-0145695. 17-MAR-2000; 2000US-0190259.	
PA	(CLIN-) CLINICAL MICRO SENSORS INC.	
Pt	Umek RM;	
XX	WPI: 2001-159728/16.	
CC	Nucleic acids containing electron-transfer group, useful as labels in hybridization assays, e.g. for genotyping, allowing repeat analyses on a single surface	
PS	Example 6; Page 128; 159pp; English.	
CC	The present invention relates to a composition comprising two nucleic acids each containing an electron-transfer group (ETM) having different redox potentials. The invention is used for electronic detection of nucleic acids, especially of substitutions (mismatches) and single-nucleotide polymorphisms, e.g. for genotyping, monitoring gene expression.	
SQ	Sequence 936 BP; 6 A; 138 C; 8 G; 8 T; 776 other;	
Oueiy Match	4.1%; Score 150.6; DB 22; Length 936;	
Best Local Similarity	1.1%; Pred. No. 1.2e-23;	
Matches	9; Conservative 508; Mismatches 217; Indels 0; Gaps	
OY	1020 attcgaaaatacgcgatgtatagtagttaaagtttaaagcaaaaatgcaa 1079	
Dd	4 www.....	
OY	1080 agaatttaagaagatgcattcaacttcgaagctcgaatgctgtagttaactcaagt 1139	
Dd	64 www.....	
OY	1140 gtttggaacctatgttacaaaacaccctcttaaacctatagaacgaggtacttcgaac 1199	
Dd	124 www..... 183	

Oy	1200	tgaacgataactttaacagtagtattgtatagaagtgttgtaacctgaaacgcgttaaacagtc	1259
Db	184	www.....	243
Oy	1260	gaacgtlacttacagatgttgaacatgnaaacgcattccagttacgatctactc	1319
Db	244	www.....	303
Oy	1320	tggtttacaattacttatcggttaaagaagcggttagtgaactggtaacaatataaact	1379
Db	304	www.....	363
Oy	1380	tgcatcaataaayltgaacaactaacctggttacaatgcagaagcttaccagtagtgtt	1439
Db	364	www.....	423
Oy	1440	cactgcgaagaagcatcagcaccaaatcgttgcacgcgtcctaactttagtggtaacac	1499
Db	424	www.....	483
Oy	1500	ttatactactggtctctcttacaacaatggttggglaaatgctgtygttgaatga	1559
Db	484	www.....	543
Oy	1560	agctgcgaacthatatcctgcttgcttcaatcacacaacgcttgcthaactaaggtagaca	1619
Db	544	www.....	603
Oy	1620	atctactttagctgataacttgytlatgttgaaaaagatctgtgtacagttgtgtctc	1679
Db	604	www.....	663
Oy	1680	tgaactaaaataatatgcagacgctaaatgyltaactttagtgcacaaagcggacttaa	1739
Db	664	www.....	723
Oy	1740	agaaataatacatctatacaataataaaaaagctggaagtcogataaagytagta	1799
Db	724	www.....	783
Oy	1800	attagcgac	1808
Db	784	wwwgccccc	792
 RESULT 11 AAFS8262 standard; DNA: 936 BP.			
XX	AAFS8262;		
AC			
DT	24-APR-2001 (first entry)		
XX			
DE	Oligonucleotide D2007.		
XX			
KW	Electron-transfer group; ETM; mismatch; genotyping; gene expression; ss.		
XX	Synthetic.		
OS			
NN	WO200107665-A2.		
FN			
PD	01-FEB-2001.		
XX			
PF	26-JUL-2000; 2000MO-US20476.		
XX			
PR	26-JUL-1999; 99US-0146695.		
XX			
PA	17-MAR-2000; 2000MS-0190259.		
XX	(CLIN-) CLINICAL MICRO SENSORS INC.		
XX			
EL	Unex RM;		
XX			





```
XX AAF58254;
AC
XX 24-APR-2001 (first entry)
DT
XX Oligonucleotide D1875.
DE
XX Electron-transfer group; ETM; mismatch; genotyping;
KM gene expression; ss.
XX
XX Synthetic.
OS
XX WO200107665-A2.
PN
XX
XX 01-FEB-2001.
PD
XX 26-JUL-2000; 2000WO-US20476.
PE
XX
XX 26-JUL-1999; 99US-0145695.
PR
XX 17-MAR-2000; 2000US-0190259.
XX
XX (CLIN-) CLINICAL MICRO SENSORS INC.
PA
XX Umek RM;
PI
XX WPI; 2001-159728/16.
DR
XX
XX Nucleic acids containing electron-transfer group, useful as labels in
PT hybridization assays, e.g. for genotyping, allowing repeat analyses on
PT a single surface.
XX
XX Example 6; Page 127; 159pp; English.
PS
XX
XX The present invention relates to a composition comprising two nucleic
CC acids each containing an electron-transfer group (ETM) having
CC different redox potentials. The invention is used for electronic
CC detection of nucleic acids, especially of substitutions (mismatches)
CC and single-nucleotide polymorphisms, e.g. for genotyping,
CC monitoring gene expression.
XX
XX Sequence 936 BP; 4 A; 144 C; 7 G; 5 T; 776 other;
SQ

Query Match 4.0%; Score 147.2; DB 22; Length 936;
Best Local Similarity 0.6%; Pred. No. 6.5e-23;
Matches 5; Conservative 506; Mismatches 269; Indels 0; Gaps 0;

OY 1024 gaaataacgagatataaagtagttaaaggtataaagacaaatgycaaagaa 1083
DB 789 GCWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 730
OY 1084 tttaagaagatgcattcacttcaagctcgaagtgtgctgtactcaagtggtt 1143
DB 729 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 670
OY 1144 ggaactaatgttaacaacaacattcgtaaactagcagcgactctgcacactgac 1203
DB 669 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 610
OY 1204 gatacttaacagtgatgttgaataagttgttagcacccggaacgtaaacgcccgaac 1263
DB 609 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 550
OY 1264 gtactatcacagatgttgaactgaaacgcatccagtaattgcactctctgtt 1323
DB 549 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 490
OY 1384 tctacaattactatactgttaaagaagcgttagtaactggttaacaataaacttgtt 1383
DB 489 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 430
OY 1384 atcaataatgtttaaacaactaactggttacaatgcagaagcttaagtgtaact 1443
DB 1384 atcaataatgtttaaacaactaactggttacaatgcagaagcttaagtgtaact 1443
```

```
DB 429 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 370
OY 1444 gcaaacgcatacagcaccactgtgtctaccgctcctactacttagtggtacaactta 1503
DB 369 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 310
OY 1504 tctactggtctcttacaacaatgtttgggtaaatggtcgtggtgtgaatgaagct 1563
DB 309 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 250
OY 1564 ggaacttattcctcgtgtcttcaattcacacaacggttgcactaagttagaagaatct 1623
DB 249 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 190
OY 1624 acttagctgatacttgtagttagttagaaagaatcgtgacagtggtgtctctgaa 1683
DB 189 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 130
OY 1684 ctaaaataatgcagcagctaaatggttaacttagtgcacaaagcgcgaacttaagaa 1743
DB 129 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 70
OY 1744 aatacaatctatcaaatcaaaaataaagaagctggaagtcgataaagtagtaatta 1803
DB 69 WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW 10

RESULT 15
AAF58257/G
ID AAF58257 standard; DNA; 936 BP.
XX
XX AAF58257;
AC
XX 24-APR-2001 (first entry)
DT
XX Oligonucleotide D1954.
DE
XX Electron-transfer group; ETM; mismatch; genotyping;
KM gene expression; ss.
XX
XX Synthetic.
OS
XX WO200107665-A2.
PN
XX
XX 01-FEB-2001.
PD
XX 26-JUL-2000; 2000WO-US20476.
PE
XX
XX 26-JUL-1999; 99US-0145695.
PR
XX 17-MAR-2000; 2000US-0190259.
XX
XX (CLIN-) CLINICAL MICRO SENSORS INC.
PA
XX Umek RM;
PI
XX WPI; 2001-159728/16.
DR
XX
XX Nucleic acids containing electron-transfer group, useful as labels in
PT hybridization assays, e.g. for genotyping, allowing repeat analyses on
PT a single surface.
XX
XX Example 6; Page 127; 159pp; English.
PS
XX
XX The present invention relates to a composition comprising two nucleic
CC acids each containing an electron-transfer group (ETM) having
CC different redox potentials. The invention is used for electronic
CC detection of nucleic acids, especially of substitutions (mismatches)
CC and single-nucleotide polymorphisms, e.g. for genotyping,
CC monitoring gene expression.
XX
XX Sequence 936 BP; 5 A; 142 C; 7 G; 6 T; 776 other;
SQ
```



**THIS PAGE BLANK (USPTO)**